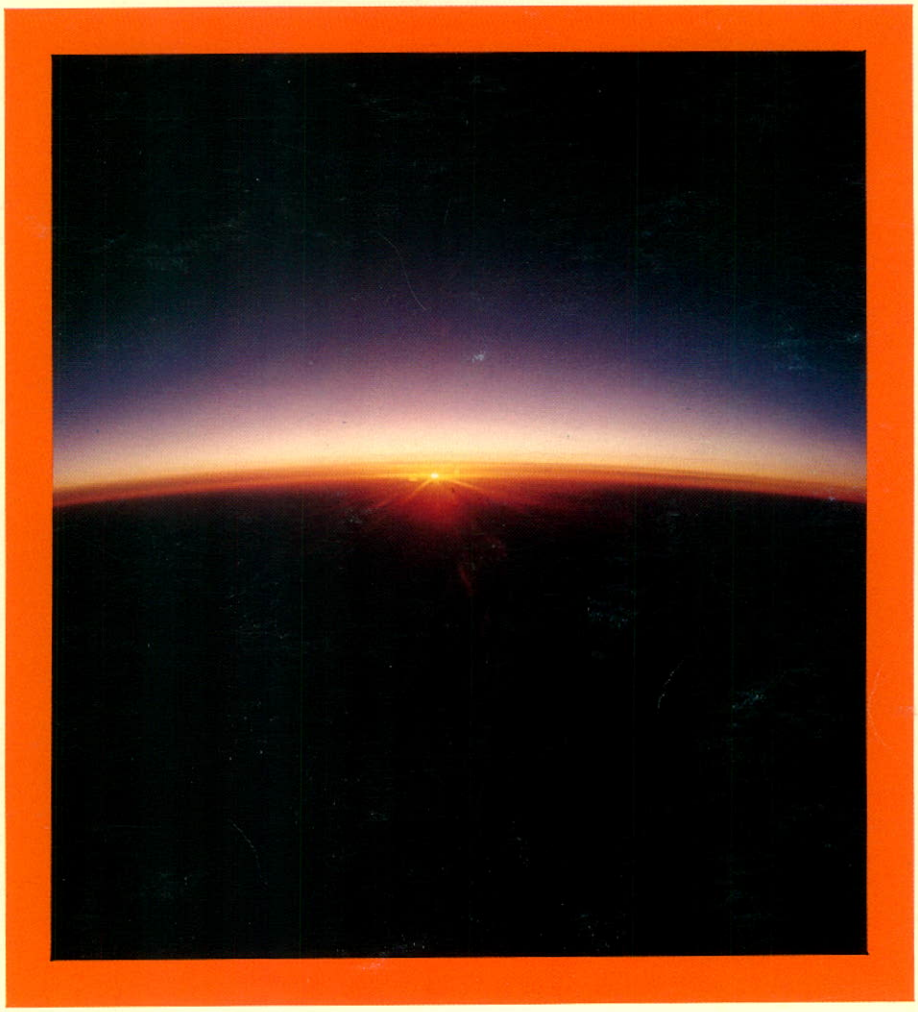
Northern Telecom
Limited

Annual Report
1982

The OPEN World



Cover
In November 1982, Northern Telecom announced the OPEN World for information management systems. The OPEN (Open Protocol Enhanced Networks) World is an extension of Northern Telecom's proven expertise in the key areas of digital technology, semiconductors, software, and communications capability. The corporation is committed to providing a planning framework, new products, features, and services for the OPEN World.

Northern Telecom Limited
Northern Telecom Limited is the second largest designer and manufacturer of telecommunications equipment in North America and is a significant supplier of integrated office systems. It operates 30 manufacturing plants in Canada, 13 in the United States, one each in the Republic of Ireland, Brazil, and England, and two in Malaysia. Research and development is conducted by 27 R&D centers located at these facilities and by Bell-Northern Research Ltd., a subsidiary, which operates six research facilities in Canada and four in the U.S. BNR is the largest industrial research and development organization in Canada.

Form 10-K
The Form 10-K annual report for 1982, as filed by the corporation with the Securities and Exchange Commission in Washington, D.C., is available to shareholders without charge upon request to Roy T. Cottier, senior vice-president, corporate relations.

Annual Meeting
The annual and special meeting of shareholders will take place at 11:00 a.m., Friday, April 29, 1983 in the Hotel Nova Scotian, Halifax, Nova Scotia.

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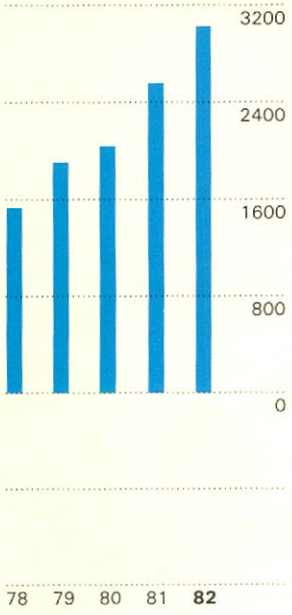
Version française
On peut obtenir la version française de ce rapport en écrivant à l'adresse suivante:
Service des relations de l'entreprise
Northern Telecom Limitée
C.P. 458, succursale A
Mississauga (Ontario)
Canada L5A 3A2

Versión española
Puede obtenerse la versión española de este informe solicitándola al
Corporate Relations Department
Northern Telecom Limited
P.O. Box 458, Station A
Mississauga, Ontario
Canada L5A 3A2

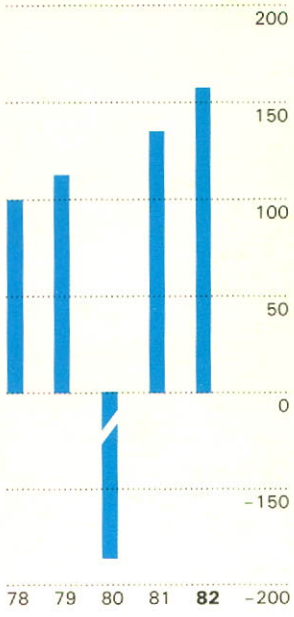
Financial highlights

	1982	1981
Revenues	**$3,035,511,000**	$2,570,875,000
Net earnings	**158,237,000**	136,657,000
Net earnings per share	**4.50**	3.95
Dividends per share	**1.00**	1.00
Shareholders' equity	**1,004,239,000**	853,456,000
Working capital	**636,956,000**	501,408,000
Capital expenditures	**252,635,000**	209,605,000
Research and development expenditures (net)	**241,407,000**	181,566,000
Shares outstanding (at December 31)	**35,450,762**	34,947,544
Shares outstanding (average during year)	**35,164,133**	34,628,544
Shareholders	**9,872**	11,364
Employees	**34,449**	35,444

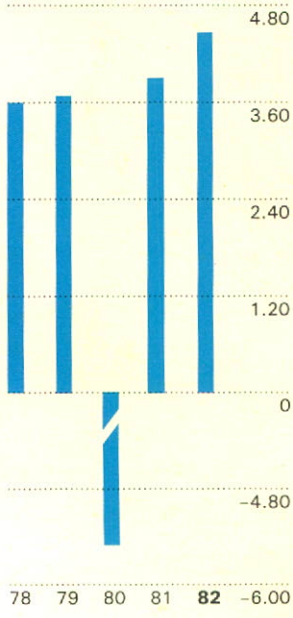
Consolidated revenues
($ millions)



Net earnings
($ millions)



Net earnings per share
($ dollars)



It was a year of milestones.

In 1982, Northern Telecom extended its international leadership in the development, manufacture, sales and service of advanced, fully digital telecommunications equipment. By yearend, the corporation had sold, or had on order fully digital switching and transmission systems to serve the equivalent of more than 10 million telephone lines. This is more than any other company in the world.

Northern Telecom announced its Digital World program in 1976. It was the first corporation to commit to the introduction of a complete family of products and systems based on digital technology–the coding of all information (voice, data, graphics, or image) into a signal of on or off bits (zeros or ones). Digital technology generally provides a higher quality signal and offers greater information handling capacity and cost-effectiveness compared with analog, the technology adopted in the 19th century with the invention of the telephone.

Since 1976, digital has won global acceptance as the basis for telecommunications networks. This demand and Northern Telecom's ability to meet or exceed its Digital World commitments have been the principal factors accounting for a 180 percent increase in the corporation's consolidated revenues since 1976 when they were $1.084 billion.

Revenues at $3 billion

Consolidated revenues and net earnings reached record levels in 1982. Revenues were $3.036 billion, up 18.1 percent from $2.571 billion in 1981. Net earnings, before extraordinary gains in both years, rose 25.3 percent to $151.2 million or $4.30 per share in 1982 from $120.7 million, or $3.49 per share in 1981.

An extraordinary gain of $7 million ($0.20 per share), arising from the use of prior years' tax losses of a subsidiary in the U.S., brought 1982 earnings to $158.2 million, or $4.50 per share. In 1981, an extraordinary gain of $16 million ($0.46 per share) was recorded from the sale of an investment, resulting in net earnings of $136.7 million, or $3.95 per share.

The 1982 gains reflected solid growth by most product lines. Central office switching revenues were up 16.5 percent. This reflects a 24 percent increase in sales of DMS digital switching equipment and the continuing decline in sales of older analog switches. Profit margins for DMS also continued to rise. Historically, central office switching is the corporation's most profitable product line. DMS has now achieved a level of profitability to where this is true again; it is expected to continue to increase in 1983.

Revenues for subscriber apparatus and business communications and network systems were up 29.6 percent in 1982 mainly due to increased sales of the SL Family of digital PBXs and packet switching systems, and sales of other network systems and telephone apparatus in the U.S.

Transmission equipment recorded a gain of 30.6 percent in 1982. Sales were particularly strong for such products as digital channel banks, the DMS-1, analog and digital microwave radio, and fiber optics systems.

Wire, cable, and outside plant was the only principal product line to decline in 1982. The 9.9 percent drop was mainly due to the effects of the economic recession in Canada and lower copper prices.

Electronic office systems (EOS) registered a modest increase in revenues of 4.9 percent. However, EOS also incurred an operating loss of $98.5 million. It is indicative of the growing profitability of the telecommunications business that Northern Telecom absorbed this loss and still achieved record financial results.

We are obviously concerned about this loss. However, to a significant extent, it reflects actions taken during the year.

These actions included the full depreciation of the lease base and write-down of inventories of mature products of the two companies acquired in 1978 (Sycor Inc. and Data 100 Corporation) that have been coming off lease. However, we must still bear considerable expense to support the remaining systems in the shrinking lease base.

We closed three small manufacturing plants in Ann Arbor, Michigan; Montevideo and St. Paul, Minnesota, and provided for the closing of a fourth plant in April 1983 in Warwick, Rhode Island. These plants were mainly associated with the production of the older product lines. We also reduced the level of EOS employment by 650 people through attrition and terminations.

The continuing decline in revenues generated by older equipment leased to customers was offset by revenues from newer product lines–the models 585 and 503 distributed data processing systems; the 290 series of on-line data entry systems; and the Displayphone, the first commercially available integrated voice and data terminal. We expect these will continue to contribute to our growth in 1983.

Integrated Office Systems

The actions taken were part of a restructuring plan which created a new organization–Integrated Office Systems (IOS).

A major part of Northern Telecom's future growth will be derived from the developing market for integrated office systems. Integrated office systems comprise a broad area from simple voice terminals to high-powered, integrated voice, data, graphics, and image work stations designed to augment the functions of office workers.

For several years Northern Telecom has been putting in place the elements necessary to serve this developing market. These include manufacturing, marketing, sales and service, and an expanding array of products and networking systems.

Northern Telecom Inc. (NTI), the corporation's U.S. operating company, formed the IOS organization to serve this market. IOS comprises several previously distinct NTI groups: Business Communications Systems, responsible for the PBX market; Network Systems, responsible for specialized and resale common carriers, the military, and large corporate networks; the Spectron data test equipment division; and Electronic Office Systems, which has been combined with NTI's Advanced Telephone Products division to form a new group called Terminal Systems.

The formation of IOS means that NTI now has a single, unified marketing and sales and service organization to serve the IOS market. In December, Edward J. Mattiuz, 43, formerly group vice-president, Business Communications Systems, was appointed group vice-president, IOS.

As a result of the formation of IOS, we will no longer be reporting EOS financial results. We expect that IOS will be an increasing contributor to Northern Telecom's growth.

The 1982 financial performance is discussed and compared with prior years' results in more detail in the Financial review on page 28.

U.S. up 39 percent

Northern Telecom incorporated NTI in 1971. In 1972, the first full year of operations, revenues amounted to about $35 million. NTI then had one manufacturing plant.

Northern Telecom has since invested substantial capital into building research and development, manufacturing, marketing, sales and service organizations in the U.S.

By the end of 1982, Northern Telecom employed 13,377 people in its U.S. operations, which included 13 manufacturing plants totalling nearly two million square feet, and 13 R&D centers associated with these facilities or operated by Bell-Northern Research (BNR), the corporation's R&D subsidiary. Our assets in the U.S. are worth nearly $1.1 billion. Northern Telecom is now the largest domestic telecommunications equipment manufacturer in the U.S. after Western Electric.

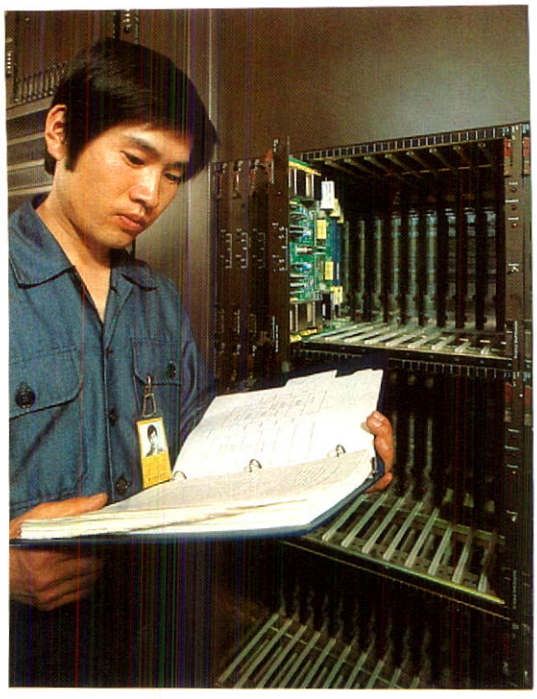
In 1982, Northern Telecom recorded dramatic growth in its U.S. revenues. Revenues in the U.S. rose 39 percent in 1982 to $1.462 billion, or 48.2 percent of total revenues, from $1.052 billion, or 40.9 percent in 1981.

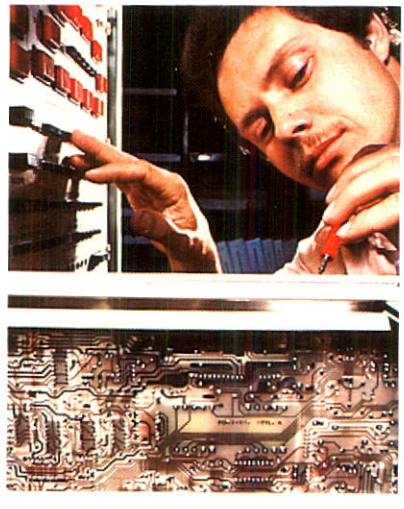
This growth meant we passed another milestone in 1982 as revenues from customers in the U.S. for the first time exceeded those recorded in Canada.

Although the U.S. economy performed poorly in 1982, Northern Telecom increased sales in most of its businesses. SL-1 revenues, for example, increased 65 percent for 1982 to US$261 million and profitability increased substantially. This reflected increasing market recognition of the reliability and capability of this system, and for the support and service behind it. It reflected also the successful introduction of a new member of the SL Family, the SL-1M, to serve the 60-line to 400-line market.

The U.S. accounted for about 67 percent of total SL-1 revenues (Canada and international markets accounted for 16 percent and 17 percent, respectively), which amounted to about $480 million in 1982, a 51 percent increase from the $318 million recorded in 1981.

Global SL-1 revenues since its introduction in December 1975 now exceed $1.3 billion. At yearend 1982, 5,687 SL-1s were installed or on order to serve about 2.2 million lines in 40 countries, making it the leading digital PBX in the world.





Northern Telecom's Winnipeg, Manitoba transmission systems manufacturing plant produced digital channel banks (right) in 1982 for use in Korea under a $60 million contract, which was extended in November by an additional $20 million.

Network Systems revenues increased 56 percent to $204 million. This group serves the specialized and resale common carriers' requirements; the market for large corporate networks (mainly with the SL-100 digital PBX that can serve needs up to 30,000 lines), and the military market.

In 1982, the first two DMS switches for the U.S. Air Force Scope Dial base-modernization program were put in service in Vandenburg, California and Osan, Korea. This contract, originally valued at US$70 million, is now expected to be worth more than US$200 million.

During the year, Network Systems assumed responsibility for the data networks business in the U.S. Another 1982 milestone was the placing in service during the summer of the first SL-10-based data packet switching system in the U.S. This 15 SL-10-nodes network of the Federal Reserve System is generating interest from other potential customers.

In 1983, Bankers Trust Company, the ninth largest bank in the U.S., will put in service a multinational data networking system using SL-10s in New York City and Hong Kong.

Network Systems will also be responsible for Northern Telecom's entry into the cellular mobile telephone systems market in cooperation with the General Electric Company (GE). Under this agreement, announced in November, GE and Northern Telecom will develop, manufacture, and market complete cellular systems with Northern Telecom providing the switching equipment based on the DMS-100 Family switches.

Sales of telephone apparatus doubled from the 1981 level to US$77 million. In particular, this was the result of a substantial increase in sales of electronic telephones.

Opportunities in the AT&T market

In the early 1970s Northern Telecom's principal U.S. market comprised the telephone companies which were not a part of the American Telephone and Telegraph (AT&T) Bell System. In 1982, AT&T and its operating companies were NTI's largest single customer, accounting for US$161 million, up 49 percent from US$108 million in 1981.

DMS accounts for a growing proportion of NTI's sales to the Bell System companies, about 41 percent of the total in 1982, compared with 31 percent in 1981. For example, under the DMS-10 supply agreement signed with AT&T in 1980, we have received orders for 156 DMS-10s; 19 operating companies have

placed 101 of these in service. Northern Telecom has signed a three-year extension through 1985 of this supply agreement. In all, more than 600 DMS-10s were in-service at yearend in the U.S., Canada, and several other countries. Northern Telecom expects to put a DMS-10 into service every working day of 1983.

The first DMS-100 large, local switch was installed in the Bell System in 1980 for trial in Ticonderoga, New York. In October 1982, we signed a four-year contract with New York Telephone to supply DMS-100s. We expect this agreement will be worth more than US$150 million. It includes shipments of 19 systems worth more than US$50 million in 1983. This agreement, the first such one signed with a Bell Operating Company (BOC), is likely to be followed by more for the DMS-100 and probably other products with other BOCs. Several BOCs have already ordered 20 DMS-100 Family switches.

The Bell System is undergoing a restructuring which will result in the divestiture of the BOCs in early 1984. This restructuring is expected to have profound effects on the U.S. market, although we do not expect to realize any major benefits until 1984.

The restructuring will create exciting and possibly substantial new opportunities for Northern Telecom and other telecommunications equipment suppliers to serve the needs of the divested operating companies. It will also bring about some significant changes in the already hotly competitive environment, attracting aggressive international companies and new competitors from other industries.

Northern Telecom is in the best position of any North American company to benefit from these changes.

The Canadian market

The achievements in Canada may be less obvious. Northern Telecom Canada Limited (NTC) already has about 70 percent of the market for its products. Accordingly, there is little NTC can do in Canada to contend with the challenges posed by a deteriorating market caused by a declining national economy. However, while demand for telecommunications systems and products dropped and our Canadian revenues were virtually unchanged from the 1981 level, NTC achieved a significant increase in profitability through productivity gains and aggressive cost-reduction efforts.

Revenues from Canadian customers in 1982 were $1.248 billion, or 41.1 percent of the total, compared with $1.248 billion, or 48.5 percent of the total in 1981.

As the Canadian economy weakened, telephone companies reduced their capital spending plans. Their spending was up only about three percent from 1981. This is an actual decline in purchased volume after accounting for inflation.

At first, telephone sets, key telephone systems, and wire, cable, and outside plant were the most affected areas, experiencing sharp drops in order input. After mid-year, virtually all areas were being impacted.

The drop in demand has necessitated employment reductions in line with order input. This has been done by layoffs where necessary, encouraging early retirements, and through attrition. However, increased demand for some products, particularly transmission systems, resulted in increased employment in some areas. Our employment in Canada declined by 1,812 people in 1982 to 18,964 people. There has also continued to be a shift in the mix of our employment to designing, developing, producing and testing high-technology products and systems. For example, BNR and the Semiconductor Components Group, increased their employment by about 300 people.

With the expiration of all of its three-year labor agreements, Northern Telecom Canada (NTC) negotiated new three-year pacts with the 11 unions representing nearly 12,000 employees across the country.

We expect significantly lower revenues and earnings in Canada in 1983.

We estimate that the Canadian telephone companies will reduce their capital spending from the depressed 1982 level by about 14 percent. Our largest customer, Bell Canada, is expected to reduce its spending by a similar amount. In 1982, Northern Telecom's revenues from Bell Canada were $845.9 million, or 27.9 percent of the total, compared with $834.5 million, or 32.5 percent in 1981.

The impact of the poor Canadian economy on our Canadian employment was considerably mitigated by the growth of Northern Telecom's business in the U.S. and international markets. In 1982, exports of parts,

components, systems, and services from our Canadian operations increased 40.2 percent to $473.9 million, compared with $337.9 million in 1981. These exports supported about 5,000 jobs in our Canadian manufacturing, administrative, and R&D operations. That represents about 26 percent of Northern Telecom's employment in Canada.

International revenues up 20 percent

International revenues in 1982 rose 19.9 percent to $325.2 million, or 10.7 percent of the total, from $271.2 million, or 10.6 percent of consolidated 1981 revenues.

This reflected gains in each of the regions in which Northern Telecom International Limited (NTIL) has established operations, including Asia, the Middle East, Europe, and the Caribbean and Latin America. Northern Telecom has sold its products in some 90 countries. There were many notable accomplishments in 1982.

For example, under a $60 million contract signed in 1981, Northern Telecom continued to supply transmission equipment to the Republic of Korea. In November 1982, this contract was extended by a further $20 million.

In August, Trinidad and Tobago awarded Northern Telecom a contract to upgrade and expand its telephone network. The first phase of this contract is estimated to be worth $60 million. The contract includes the supply of digital switching systems, telephone sets, transmission, and cable and outside plant equipment and the training of Trinidad and Tobago Telephone Company personnel to operate Northern Telecom's equipment. It is expected that most of this will be supplied from Canada.

This contract is one of many examples of the mutual benefit of the relationship between Northern Telecom and its parent company, Bell Canada, and of what they can offer customers around the world. Bell Canada International, under a $13 million subcontract, will assist in the Trinidad and Tobago expansion program.

In Korea, Northern Telecom signed a license and technical assistance agreement covering the SL-1 with Taihan Telecommunications Company Limited. It will be produced in Taihan's Incheon, Korea plant. Northern Telecom has previously licensed the SL-1 to Olivetti of Italy; General Electric Company of the U.K.; and, Televerket, the Swedish telecommunications authority.

Field trials of the DMS-1A subscriber carrier system, designed for international markets, began in Lebanon, Qatar, the United Kingdom, Norway, Iraq, and Libya.

Empresa Publica Correios e Telecomunicações de Portugal (CTT) signed a $3.1 million contract with NTIL for an initial four SL-10s to serve as the backbone of a public packet switching network. Other countries where SL-10s are installed include Canada, the U.S., U.K., Austria, Switzerland, West Germany, and Belgium.

Northern Telecom obtained its first international fiber optics order when the Barbados Telephone Company contracted for a 14.3-mile optical systems network worth more than $1.5 million. Barbados' modernization program has also included 16 DMS switching and transmission systems.

The Bahamas Telecommunications Corporation awarded NTIL a US$9.5 million contract for digital systems.

In June, Northern Telecom (Ireland) Limited officially opened a 25,000-square-foot expansion of its plant in Galway, Eire. The 60 percent expansion brought the total size of the plant to 65,000 square feet for the production of SL-1s and SL-10s for the European and other international markets.

New plants and expansions

Northern Telecom's 1982 capital expenditures for plant and equipment were $252.6 million, up 20.5 percent from $209.6 million in 1981. The corporation expects its 1983 capital spending to be up about 23 percent to $310 million. A significant portion of these investments is for new equipment and business systems to support productivity and cost-reduction efforts. In addition to the Galway plant, a number of other new facilities or plant expansions were also completed or announced.

In April, Northern Telecom officially opened its second semiconductor components facility. This US$23 million, 63,000-square-foot plant near San Diego, California has a planned capacity of about one-half million custom semiconductors per month for use in the corporation's telecommunications products.

Reflecting the growth of Northern Telecom's SL-10 business, a $3.5 million, three-story data networks headquarters building near Ottawa, Ontario was built during 1982. Data networks revenues increased 37 percent in 1982 to $36.4 million from $26.6 million in 1981.

Construction began for a 377,000-square-foot R&D facility near Ottawa, Ontario for BNR. Upon completion in 1984, the new R&D building, which will be attached to the present BNR central laboratory, will represent a new capital investment of $37.4 million. This is the largest private-sector, high- technology project ever undertaken in the Ottawa region. The new BNR laboratory will bring the total Northern Telecom and BNR investment in the Ottawa area to $174 million.

In March, NTC officially opened its Saskatoon, Saskatchewan facility for the production of optoelectronics communications systems. The $14 million, 91,000-square-foot facility enables the corporation to extend its fiber optics marketing activities into international markets. Northern Telecom has sold or on order 115 fiber optics networks.

Optical systems revenues in 1982 nearly doubled to more than $37 million. In January 1983, Northern Telecom announced its first contract for single-mode optical fibers. Single-mode fiber offers three-to-five more communications channels per fiber than previous technologies. The four-year contract for delivery of 62,000 miles of fiber optics cable to MCI Communications Corp. is Northern Telecom's first major optical systems contract in the U.S. and is the largest ever placed by one company for single-mode fiber. Its value is estimated at about $100 million or more over the four-year period.

Northern Telecom is investing $40 million in the expansion of its business products operations in Calgary, Alberta. The new 175,000-square-foot plant will replace a leased 80,000-square-foot facility. The plant will be responsible for the production of the Vantage 12 and newly introduced Vantage 48 electronic key telephone systems.

In November, NTC officially opened a $25 million transmission equipment plant in Winnipeg, Manitoba. The 96,000-square-foot plant employs more than 500 people and exports about two-thirds of its production.

In the U.S., the growth of NTI's outside plant business required a US$3 million 16,000-square-foot expansion of Cook Electric's Morton Grove, Illinois plant to be completed by early 1984.

Demand for the SL-1 requires an expansion of NTI's PBX manufacturing plant in Santa Clara, California. In December, ground was broken for a 104,000-square-foot addition that will bring the total plant to 321,000 square feet when it is completed in 1983.

Significant organization changes

Planning for Northern Telecom's growth and the changing nature of our markets, we implemented several significant organization changes.

In April, 1982 Walter F. Light, 59, was appointed chairman of Northern Telecom Limited's Board, succeeding A. Jean de Grandpré, 61, who had served as chairman since January 1980. Mr. de Grandpré continues to serve as a director, and Mr. Light retains his role as the corporation's chief executive officer. Edmund B. Fitzgerald, 57, formerly president, NTI, was appointed president of Northern Telecom Limited, succeeding Mr. Light.

Desmond F. Hudson, 46, was appointed president of NTI. He had previously served as NTI's executive vice-president, IOS as it was formed in 1982.

Effective January 1, 1983, Basil A. Beneteau was appointed a director and vice-chairman of Northern Telecom Limited. In his new position, Mr. Beneteau, 57, who had previously served as the president of Northern Telecom Canada, will be responsible for the corporation's activities outside of North America. He will also continue to assist the chairman and chief executive officer in maintaining Northern Telecom's widening range of important relationships in Canada.

David G. Vice, 49, formerly group vice-president, transmission, for NTC, succeeded Mr. Beneteau as president.

In October, Northern Telecom Electronics Limited (NTE) was activated and Charles G. Millar was appointed its president. NTE will be responsible for the manufacture of common components for Northern Telecom's global operations. Mr. Millar, 56, retains his role as executive vice- president, operations, Northern Telecom Limited.

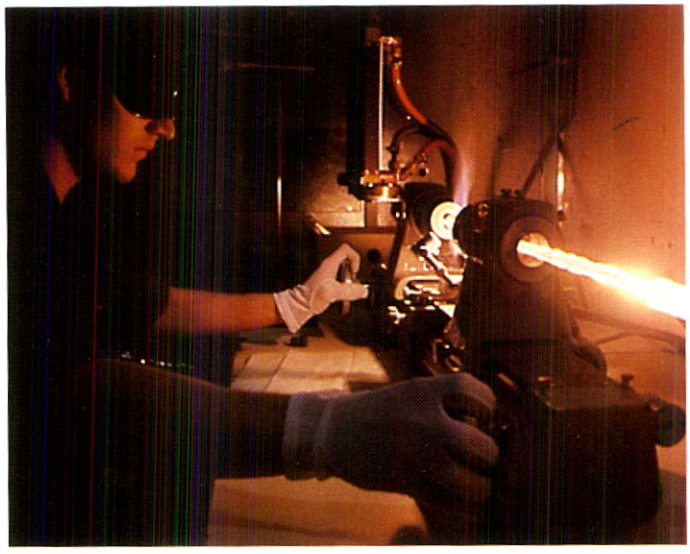
John A. Roth, 40, formerly executive vice-president, BNR, was appointed president. Donald A. Chisholm, 55, BNR's former president, continues as its chairman and was appointed executive vice-president, technology and innovation, Northern Telecom Limited. Dr. Chisholm will serve as the chief scientific advisor to the chief executive officer and as senior spokesman to the scientific community.

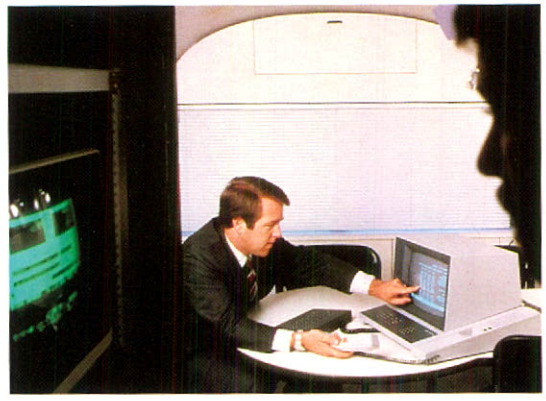
Mr. Roth implemented an internal reorganization of BNR to structure all its R&D activities into two principal groups, reflecting the market direction of Northern Telecom. Klaus M. Buechner, 38, was appointed vice-president, office products group and president, BNR Inc., BNR's U.S. subsidiary, and Howard M. Bender, 45, was appointed group vice-president, network products.

Northern Telecom International Limited was established in 1977 to direct the corporation's international operations with particular responsibility for exports to offshore markets from our Canadian plants. In 1982, Northern Telecom International Inc. was formed to be responsible for exports from our U.S. manufacturing facilities.

Two new directors were elected to the Board at the annual meeting. James W. Kerr, 68, a director of, and consultant to, TransCanada PipeLines, Toronto, and former president and chief executive officer of that company, and William M. Sobey, 55, chairman of the Board of Sobeys Stores Limited, Stellarton, Nova Scotia joined the Northern Telecom Board in April. David W. Barr and J. Douglas Gibson, who served the corporation and its shareholders as directors since 1976 and 1972, respectively, retired from the Board and did not stand for re-election. We appreciate their contributions to guiding the growth of the corporation during their years of service.

Production of fiber optics at Northern Telecom's new optical systems plant in Saskatoon, Saskatchewan.





Inside Bell-Northern Research's new laboratory-on-wheels trailer is sophisticated computer equipment and facilities for market testing and human factors research for new communications products and services. The 31-foot mobile laboratory, the first of its kind in the telecommunications industry, is now being used to test prototypes of Northern Telecom's new OPEN World terminals.

OPEN World

The cover of this annual report and the theme, which begins on page 15, are devoted to the most significant milestone of 1982, the announcement of the OPEN World. OPEN World is expected to be as significant to the future of Northern Telecom as has been the Digital World program announced in 1976.

The OPEN World involves planning criteria, new products, and enhancements of established products such as the DMS and SL families, to address the growing market for improved information management.

Northern Telecom has publicly committed itself to a five-year program to introduce new products, feature enhancements, and services, as described in the theme article. OPEN World is based on Northern Telecom's proven capabilities in designing, developing, and producing digital systems. This program will require an investment, as a part of the corporation's total R&D program, of $1.2 billion in this area alone between 1983 and 1987. We expect that OPEN World will generate revenues during that period of about $13 billion.

The Outlook

We enter 1983 in excellent financial condition. We are very confident about achieving significant revenues growth in our international and U.S. operations; we expect U.S. revenues may account for about 55-60 percent of 1983 consolidated revenues. However, the growth in the U.S. and internationally will be largely offset by the expected decline in the Canadian market. This was reflected in the level of order input in Canada during the latter part of 1982. As a result, the corporation's backlog of orders at yearend was $1.173 billion, down 6.6 percent from $1.256 billion at the end of 1981.

Accordingly, we expect consolidated revenues growth to be modest in 1983. The gain in net earnings should be substantially greater. This will result from the revenues growth, continuing margins' improvements resulting from our productivity and cost-reduction efforts, and particularly from a considerable reduction in the losses that were recorded in 1982 in the EOS operations.

In 1967, an agency of the Canadian federal government, the Restrictive Trade Practices Commission (RTPC), began a study of the relationship of Bell Canada, Northern Telecom, and BNR. In 1977, the RTPC began more than five years of hearings, during which it investigated if it might be in the public interest for Bell to divest Northern Telecom.

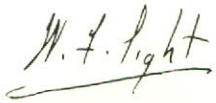
Near the end, the hearings shifted to a consideration of competitive bidding. This was despite the fact that Bell already buys a considerable amount from other suppliers and that Northern Telecom has a supply agreement with Bell that states that the corporation must sell to Bell Canada at as low a price as to any other Canadian customer.

The hearings ended in mid-1982. In January 1983, the RTPC issued its final report. We are very pleased with the RTPC's conclusions which recognized the benefits of the relationship between the three companies and, simply stated, recommended that the status quo be maintained.

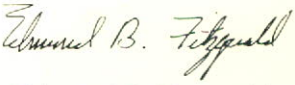
Northern Telecom will maintain its emphasis on a consistent research and development program. In the past, the corporation has stated that an appropriate level would be about seven percent of consolidated revenues. While this represents a minimum level, we will consider increasing it as our growth permits.

In 1982, Northern Telecom's net R&D investment was increased by 32.9 percent to $241.4 million, compared with $181.6 million in 1981. This represented rates of eight percent and 7.1 percent of revenues, respectively. In 1983, Northern Telecom again will increase the rate of its R&D spending and the net R&D investment will be about $285 million, up about 18 percent from 1982. Our R&D investments will average about nine percent or more of revenues during the next several years as we carry out the OPEN World program.

The total of nearly $600 million to be invested in 1983 in research and development and capital expenditures for plant and equipment represents our commitment to the future growth and success of Northern Telecom.



Walter F. Light
Chairman and
Chief Executive Officer



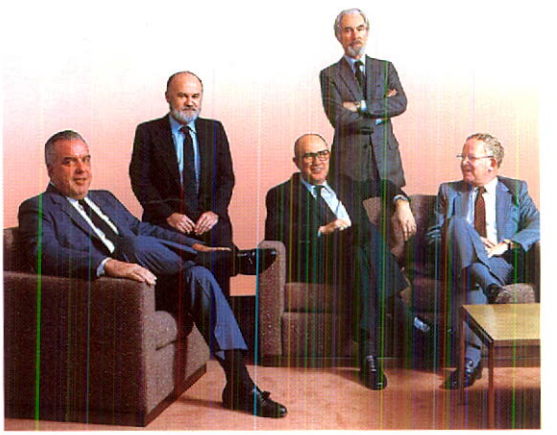
Edmund B. Fitzgerald
President

February 2, 1983

Committees of the Board of Directors and Executive Council

Executive Committee
Members of the committee are (standing from the left) J. H. Moore, R. S. Hurlbut, A. J. de Grandpré, (seated from the left) J. C. Thackray, E. B. Fitzgerald, G. Plourde, W. F. Light, chairman of the committee, and (not shown) C. S. Malone.

Executive Council
Members of the council are (from the left) E. B. Fitzgerald, (chairman of the council), D. A. Chisholm, W. C. Benger, R. T. Cottier, D. F. Hudson, and (opposite page)



Management Resources and Compensation Committee
Members of the committee are (from the left) C. Perrault, J. C. Thackray, A. J. de Grandpré, W. L. Naumann, (chairman of the committee), I. A. Barclay, and J. W. Kerr.

Pension Fund Policy Committee
Members of the committee are (from the left) W. M. Sobey, R. C. Scrivener, (standing left) E. B. Fitzgerald, D. S. Harvie (chairman of the committee), and (not shown) G. L. Demers.

Audit Committee
Members of the committee are (standing left) C. S. Malone, W. O. Beers, and (seated from the left) R. C. Scrivener, C. Perrault, J. H. Moore (chairman of the committee), W. M. Robinson, and (not shown) R. S. Hurlbut.

D. G. Vice, C. V. Allen, C. G. Millar, J. A. Roth, R. A. Ferchat, W. F. Light, and (above) B. A. Beneteau.

Directors and officers

The Board of Directors is responsible for the management of the corporation's business and affairs. Each director serves on one or more Board committee. These committees review the matters for which they are responsible and submit their recommendations to the Board. In some instances, they are authorized by the Board to act for it. The Board committees are:

– *The Executive Committee,* which met 10 times in 1982. It approves the corporation's annual capital spending budget, capital appropriation requests in amounts exceeding the limits of officer authority, the disposition of significant capital assets, and assumption of significant long-term leases. It reviews coverage for such risks as loss, fire, or theft.

– *The Audit Committee,* which met eight times in 1982. It has the primary responsibility for reviewing and recommending for Board approval the annual consolidated financial statements and reviewing the consolidated quarterly financial statements. The committee approves accounting policies and the scope of audit activities.

– *The Management Resources and Compensation Committee (MRCC),* which met 10 times in 1982. It is primarily responsible for reviewing and recommending to the Board the appointment and remuneration of corporate officers and senior officers of the principal subsidiaries. It reviews existing and proposed employee benefits plans and recommends material changes to existing plans. The MRCC ensures the adequacy of personnel recruitment and development programs, and the succession plans of senior management. It reviews and recommends the appropriation of funds for, and the awards made under, incentive remuneration and similar plans. The MRCC acts as the nominating committee which identifies and proposes candidates for appointment to the Board.

– *The Pension Fund Policy Committee (PFPC)* which met five times in 1982. It approves the policies followed by the corporation's pension funds. It reviews the investments made by, and the performance of, the pension funds, and the actuarial assumptions for determining the liabilities of the funds.

The Executive Council of the corporation, which meets monthly, recommends policies and long-term growth strategies to the Chief Executive Officer of the corporation and reviews current operations.

Directors

Ian A. Barclay[3]
Chairman of the Board
British Columbia Forest Products Limited
Vancouver, British Columbia

William O. Beers[2]
Former Chairman of the Board and Chief Executive Officer
Kraft, Inc. Chicago, Illinois

Basil A. Beneteau
Vice-chairman of the Board
Northern Telecom Limited

A. Jean de Grandpré, O.C., Q.C.[1,3]
Chairman of the Board and Chief Executive Officer
Bell Canada
Montreal, Quebec

Georges L. Demers, Q.C.[4]
Counsel to
Demers, Gosselin and Robitaille
Quebec City, Quebec

Edmund B. Fitzgerald[1,4]
President
Northern Telecom Limited

Donald S. Harvie, O.C.[4]
Chairman
Devonian Group
Calgary, Alberta

Robert S. Hurlbut[1,2]
Chairman of the Board and President
General Foods, Inc.
Toronto, Ontario

James W. Kerr[3]
Former Chairman of the Board and Chief Executive Officer
TransCanada Pipelines Limited
Toronto, Ontario

Walter F. Light[1]
Chairman of the Board and Chief Executive Officer
Northern Telecom Limited

Clifford S. Malone[1,2]
Vice-chairman
United Corporations Limited
Toronto, Ontario

John H. Moore[1,2]
Chairman of the Executive Committee of the Board
London Life Insurance Company
London, Ontario

William L. Naumann[3]
Former Chairman of the Board and Chief Executive Officer
Caterpillar Tractor Co.
Peoria, Illinois

Charles Perrault[2,3]
President
Perconsult Ltd.
Montreal, Quebec

Gérard Plourde, O.C.[1]
Chairman of the Board
U.A.P. Inc.
Montreal, Quebec

Walter M. Robinson, Jr.[2]
Former Chairman of the Board and Chief Executive Officer
NLT Corporation
Nashville, Tennessee

Robert C. Scrivener[2,4]
Former Chairman of the Board and Chief Executive Officer
Northern Telecom Limited

William M. Sobey[4]
Chairman of the Board
Sobeys Stores Limited
Stellarton, Nova Scotia

James C. Thackray[1,3]
President
Bell Canada
Montreal, Quebec

[1]Member of the Executive Committee
[2]Member of the Audit Committee
[3]Member of the Management Resources and Compensation Committee
[4]Member of the Pension Fund Policy Committee

Officers

Chairman of the Board and Chief Executive Officer
Walter F. Light

President
Edmund B. Fitzgerald

Vice-chairman of the Board
Basil A. Beneteau

Executive vice-presidents
Walter C. Benger
Marketing

Donald A. Chisholm
Technology and innovation

Robert A. Ferchat
Finance and administration

Charles G. Millar
Operations

Senior vice-presidents
Clive V. Allen
General counsel

Roy T. Cottier
Corporate relations

C. Denis Hall
Technology

Vice-presidents
J. Derek M. Davies
Business development

Robert Kenedi
Technology

John D. MacDonald
Operations, manufacturing

R. Brian O'Regan
Public affairs

John J. Rankin
Human resources

Vice-president and treasurer
David W. Kendall, Jr.

Secretary
Anthony J. Lafleur

Controller
Donald K. Peterson

Northern Telecom Limited and principal subsidiaries

Northern Telecom Limited is responsible for establishing the policies and long-term growth strategies of the corporation, carrying out certain administrative functions, and for coordinating its principal operating subsidiaries.

Four principal subsidiaries are headquartered in Canada:

–*Northern Telecom Canada Limited (NTC),* is responsible for manufacturing, marketing, and servicing of telecommunications products in the Canadian market. NTC operates 30 manufacturing plants and 17 R&D laboratories associated with these plants.

–*Northern Telecom International Limited,* which together with Northern Telecom International Inc. established in the U.S. during 1982, is responsible for marketing and servicing of telecommunications equipment outside of North America.

–*Northern Telecom Electronics Limited,* which manufactures common components for Northern Telecom's global operations.

–*Bell-Northern Research Ltd. (BNR),* the largest industrial R&D organization in Canada. BNR, which is owned 70 percent by Northern Telecom and 30 percent by Bell Canada, operates three laboratories in Ottawa, Ont. and one each in Toronto; Montreal, Que.; Edmonton, Alta.; and, through its U.S. subsidiary, BNR Inc., one each in Mountain View, Cal.; Ann Arbor, Mich; Dallas, Tex.; and Raleigh, N.C.

In the U.S., *Northern Telecom Inc. (NTI)* is responsible for the telecommunications and integrated office systems (IOS) businesses. It also directs IOS activities internationally. NTI operates 13 manufacturing plants and nine R&D associated laboratories.

Manufacturing locations

Business communications systems
Canada
Belleville, Ont.
United States
Santa Clara, Cal.

Cable
Canada
Amherst, N.S.
Calgary, Alta.
Kingston, Ont.
Lachine, Que.
Regina, Sask.

Components
Malaysia
Penang

Components and printed circuit boards
Malaysia
Kedah

Data Networks
Canada
Belleville, Ont.

Hybrid substrates and printed circuit boards
United States
West Palm Beach, Fla.

Information processing systems
Canada
Scarborough, Ont.
Great Britain
Hemel Hempstead
United States
Minnetonka, Minn.

Network systems
United States
Richardson, Tex.

Outside plant
Canada
St. Laurent, Que.
United States
Morton Grove, Ill.
Brazil
Rio de Janeiro

Printed circuit boards
Canada
Belleville, Ont.

Repair and overhaul
Canada
Calgary, Alta.
Montreal North, Que.
North York, Ont.
Saint John, N.B.

Semiconductor components
Canada
Ottawa, Ont.
United States
San Diego, Cal.

Subscriber apparatus
Canada
Amherst, N.S.
Calgary, Alta.
London, Ont.
Regina, Sask.
Saint John, N.B.
United States
Nashville, Tenn.
Republic of Ireland
Galway

Switching
Canada
Brampton, Ont.
Calgary, Alta.
Charlottetown, P.E.I.
LaSalle, Que.
Montreal, Que.
St. John's, Nfld.
United States
Creedmoor, N.C.
Morrisville, N.C.
Raleigh, N.C.

Test equipment
United States
Concord, N.H.
Moorestown, N.J.

Transmission
Canada
Aylmer, Que.
Saskatoon, Sask.
St. Laurent, Que.
Winnipeg, Man.
United States
Atlanta, Ga.

This chart is not intended to denote the legal or parent-subsidiary relationships. It reflects the administrative organization of the corporation as at December 31, 1982.

Senior management of principal subsidiaries

Bell-Northern Research Ltd.

Chairman of the Board
Donald A. Chisholm

President
John A. Roth

Group vice-president
Howard M. Bender
Network products

Vice-presidents
John S. Buchan
Transmission products

Klaus M. Buechner
Office products group

John Elliott
Corporate development

Tom M. Hennebury
Human resources and administration

Owen W. McAleer
Systems

George C. Smyth
Digital switching systems development

Anthony G. Stansby
Semiconductor applications

Brian G. Watkinson
Access and services

Secretary and legal counsel
Roméo C. Champagne

Treasurer and controller
David T. Boyce

BNR Inc.

President
Klaus M. Buechner

Vice-president
David A. Twyver
Private switching systems

Data 100 Europe B.V.

Managing director
Barry W. Eames

Northern Telecom A.G.

Managing director
Hugh A. Hamilton

Northern Telecom (Asia) Limited

Managing director
Mendel C. Cohen

Northern Telecom (CALA) Corporation

President and general manager
Jean-Paul Gagnon

Northern Telecom Canada Limited

President
David G. Vice

Executive vice-presidents
Kenneth H. Woodley
Finance and administration

H. Lloyd Webster
Marketing and technology

Group vice-presidents
André J. Boutin
Cable

Ewart O. Bridges
Switching

L. Ross Campbell
Transmission

Donald A. Noble
Subscriber equipment

Vice-presidents
David D. Archibald
Secretary and general counsel

Robert M. Cuddy
Manufacturing

Richard A. Fortier
Personnel and industrial relations

Roy McClean
Integrated Office Systems

John P. Strimas
Public relations

David J. Thomas
Finance

Elliott Turcot
Advanced switching

R. R. Watt
Cable operations

Northern Telecom Electronics Limited

President
Charles G. Millar

Vice-presidents
Ronald A. Hunter
Electronic components

John D. MacDonald
Manufacturing development

A. Graham Sadler
Semiconductor components

Anthony G. Stansby
Business development

Northern Telecom Inc.

President
Desmond F. Hudson

Executive vice-presidents
L. Colin Beaumont
Technology

John W. Caffry
Finance and administration

Marcelo A. Gumucio
Marketing

George W. Sullivan
Federal systems and international

Group vice-presidents
Bob G. Davis
Operations, Integrated Office Systems

Edward J. Mattiuz
Integrated Office Systems

Roy Merrills
Operations, Digital Switching Systems

Thomas R. Worthy
Digital Switching Systems

Vice-presidents
William C. Cawthon
Operations

Jerry L. Kreiger
Human resources

Eugene B. Lotochinski
Corporate planning

John MacDonald
Treasurer

Edward B. Matthews
Office systems technology

Richard R. Standel, Jr.
General counsel and secretary

D. Wynn Walters
Public relations

Northern Telecom Industries Sdn. Bhd.

Managing director
Ho Boon Theam

Northern Telecom International Limited

President
William T. Simpson

Vice-president
Jean-Paul Gagnon

Secretary
David D. Archibald

Northern Telecom (Ireland) Limited

Chairman of the Board
Lord Killanin

Managing director
Patrick J. Hogan

Northern Telecom (Middle East) Limited

Managing director
Brian Baynes

The OPEN World

OPEN (Open Protocol Enhanced Networks) World is Northern Telecom's approach to information management systems. OPEN World products, systems, and services will enable organizations to connect many types and makes of equipment in one integrated system that can evolve as requirements and technology evolves.

As food and water are critical to sustain life, the existence of an organization depends on certain key resources. The extent of an organization's success depends on how effectively it employs and manages these resources.

An organization requires capital to get established and to grow. How efficiently it invests this capital–in research and development, marketing and sales, plant and equipment, and inventory–determines its ability to compete.

An organization's success reflects the quality of the people it attracts, develops, and retains. Their contributions depend on whether they have the tools to do their jobs and on how well they are motivated to meet the organization's objectives.

An essential tool that people, particularly knowledge workers, need to do their jobs is information. Information is an organization's most fundamental and strategic resource.

"It is clear that the organizations which will excel in the '80s will be those that recognize information as a major resource and structure it as efficiently as they do other assets," states John Diebold, a noted authority on data communications and information management.

"The three most valuable strategic resources our organization possesses are people, money, and information. Of these, information is without a doubt the most difficult to manage," says Walter F. Light, the chairman and chief executive officer of Northern Telecom.

Information is difficult to manage in most organizations because large numbers of users, consultants, manufacturers, and suppliers of various products, systems, and services have, over many years, each designed their own solutions to particular situations.

As a result, some products and systems don't work well together–if they can communicate at all–to access, exchange, or share information. They use different procedures and methods for handling, accessing, and transmitting information.

This results in excess cost and lost time to obtain, store, and retrieve information. The direct costs are for more equipment than should be necessary and for inefficiently used services. The indirect costs are more important. Those indirect costs are reduced efficiency and frustration among an organization's employees who may not be able to get the information they need, when they need it, and in the organization being less agile in responding to rapidly changing business conditions.

In a typical organization, there is a proliferation of products and systems for information management which may be categorized as belonging to one of three industries that evolved as distinct entities during the past century: telecommunications, data processing, and office equipment.

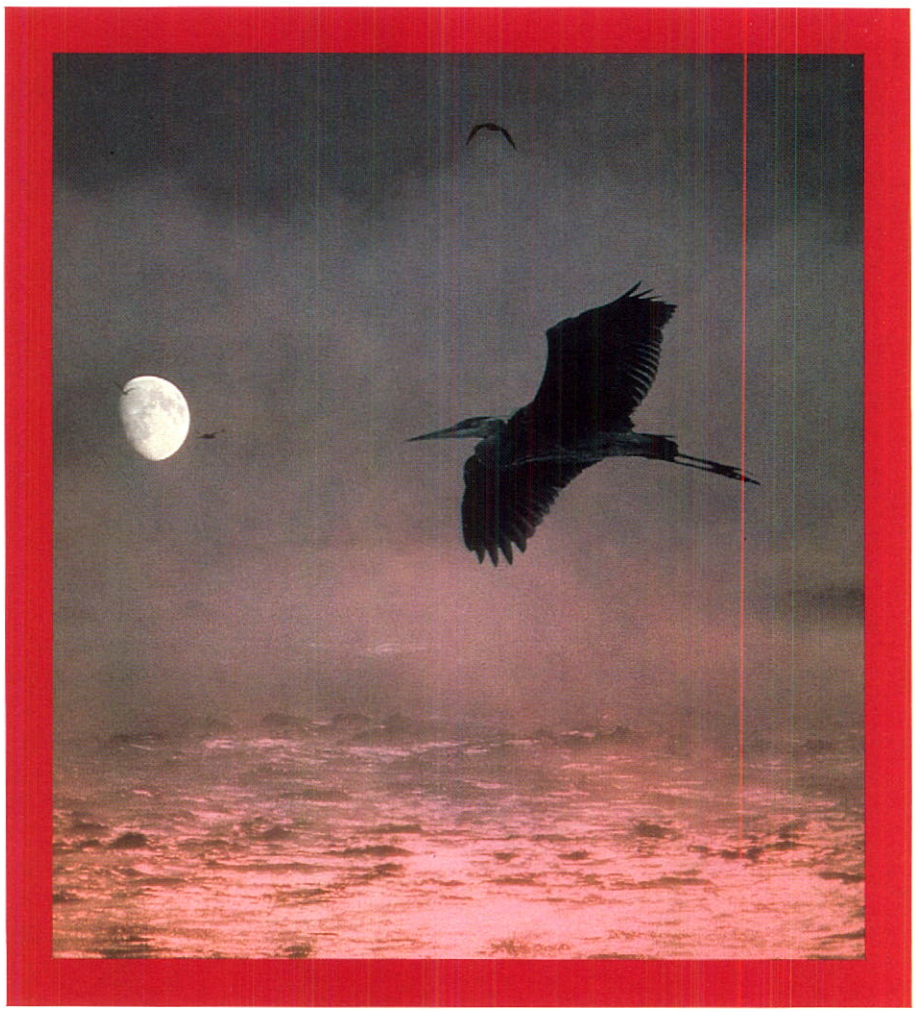
However, during the past decade, the lines of distinction between them have begun to blur. A convergence is taking place driven by the advances being made in four areas: digital technology; semiconductors; software; and communications capability. These elements have become common to the products of each of the three industries.

Digital–the common format

Human speech generates sound waves that continuously vary in volume and frequency. These are called analog waves. For nearly a century, the telephone network was based on a means of converting these waves into electrical signals at the transmitter (the mouthpiece of a telephone) and back to sound waves at the receiver (the earpiece). When data was sent between computers over the telephone network, it had to be converted into analog signals by a device called a modem (MOdulator/DEModulator).

Digital is comparable to the telegraph. A digital signal is information–voice, numbers, letters, images–coded as a string of on or off bits (zeros or ones). Digital has always been

Control



An organization should be able to control the design, building, and operations of its information management system. Advances in semiconductor technology have contributed to making it economically attractive to add new features to information systems. Northern Telecom is a leader in the development and manufacture of custom large-scale integrated circuits. This 100mm in diameter silicon wafer (bottom right) contains 234 of Northern Telecom's advanced E99 line-card chips. The E99, used in the DMS-100 Family digital switches, is two-to-three years ahead of other such integrated circuits.

the natural means of transmitting data. The telephone network was designed as an analog system because there was no practical and economical means of coding and decoding the human voice into digital format.

Semiconductors make it possible

Advances made in the Sixties and Seventies in designing and producing increasingly complex and capable semiconductors have made it possible to adopt digital technology as the fastest, most reliable, and the most cost-effective means of transmitting information in a common format, regardless of whether it is data, graphics, image, or voice.

Semiconductors are fingernail-size devices that are generally made from silicon. *Semiconductor, integrated circuit,* and *chip* are terms commonly used interchangeably in writing and speech. Semiconductors may have precisely etched circuit patterns and the equivalent of tens of thousands of discrete electronic elements (such as transistors) and more than a thousand miles of wiring, connecting them. One type of semiconductor, for example, can store up to 64,000 bits of information, and chips that can hold 256,000 bits of information are expected to be commercially available in the near future.

Semiconductors called codecs (COder/DECoder) are the devices now used to convert analog voice signals to digital and back again. Semiconductors have also made it possible to put increasing amounts of intelligence in virtually any kind of terminal, including the telephone or a typewriter.

The power of software

Software is the list of step-by-step instructions that tells a machine exactly how to perform a desired function. The machine could be a word processor, a central mainframe or desk-top computer, or a telephone switching system. The instructions may be as complex as telling the machine to "set up a connection between this line and that one, ensure it functions properly, and simultaneously record the fact that a call was made and what the billing should be." Those are some of the typical tasks of a telephone switching system.

The power of software is that by changing or adding to it, new functions can be created for the system. This flexibility makes it economically possible to expand the capabilities of telephone switches, mainframe computers, or word processors. The range of applications is often limited only by the ability of a system to accept and store additional software.

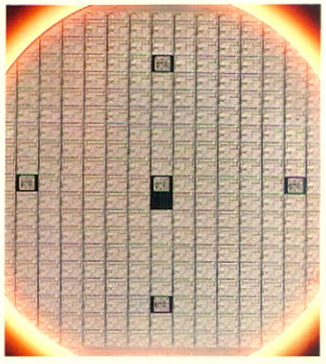
Digital technology, semiconductors, and software are now found in telecommunications, data processing, and office equipment products and systems. Communications is the fourth element common to the three industries.

The communications link

Communications is the essence of the global telephone network. Today, this network handles information in any format–voice, data, graphics, or image.

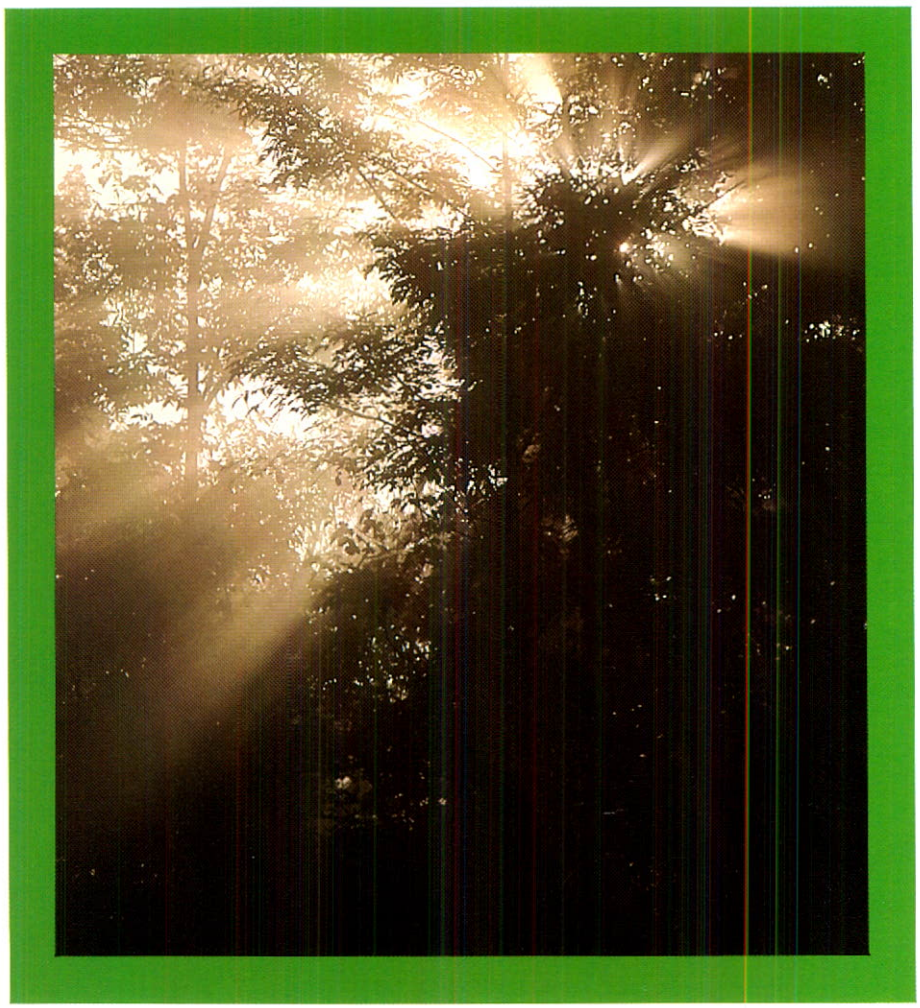
As the telecommunications industry evolved over the past century, it adhered to agreed-upon standards. Every manufacturer's system, regardless of where in the world it was produced, or in what decade it was developed, could function as an integral part of the network because of these standards.

The more recent evolution of the data processing and office equipment industries has been less orderly and planned. The evolution from central mainframe computers to distributed data processing, and now to a proliferation of personal computers, minicomputers, microcomputers, computers with word processing and word processors that function like computers, has made communications between systems increasingly desirable. These systems must be able to access, exchange or share information if they are to perform on a universal basis the functions for which they were designed.



In nature, the free power of the sun creates plant matter in the process called photo-synthesis. In an organization, an information management system's cost-effectiveness will be judged by the economic advantages and investment returns it can offer. The value of digital switching systems, such as the DMS central office (bottom right) or an SL PBX, may be easily enhanced by the addition of new-software driven features.

Cost-effectiveness



But, as the data processing and office equipment industries evolved, each manufacturer developed its own systems and techniques for communications. As a result, the equipment developed by one manufacturer often cannot exchange information with equipment supplied by another company.

In some cases, this may have been calculated marketing strategy. Suppliers with large market shares found it advantageous to maintain their own proprietary standards. By preventing their systems from being able to work with other manufacturers' systems, they could lock-in customers and lock-out competitors.

The necessary elements are available today to create integrated systems capable of communicating voice, data, graphics, and image information with each other. This requires only that the growing expertise in digital technology, semiconductors, software, and communications be applied to removing the barriers that have evolved, opening the way for effective information management systems.

Northern Telecom has been a pioneer in the development and introduction of digital technology. The corporation designs, develops, and manufactures custom semiconductors used in its products ranging from electronic telephones and other terminals to central office telephone switches and private branch exchanges (PBXs). It has been creating software for its systems since the 1960s. It has been designing, manufacturing, installing, and servicing telecommunications networks since the 1880s.

Since the mid-70s, Northern Telecom's research and development laboratories have been working to apply the corporation's expertise in these areas to meet the need for efficient, integrated information management systems.

Towards the Intelligent Universe

In November 1982, Northern Telecom hosted a series of seminars, called "Towards the Intelligent Universe", at which the corporation publicly committed itself to provide, during the next five years, enhancements to its established DMS and SL digital systems, and new products and features. It will be possible for organizations to integrate Northern Telecom's DMS and SL digital switches and other products and systems with those provided by other manufacturers and suppliers into cost-effective information management systems.

This is Northern Telecom's OPEN World for information management. The corporation's five-year research and development program through 1987 will include $1.2 billion dedicated to the further development of OPEN World products, services, and features.

This is not the first time that Northern Telecom has made such a long-term, public commitment. The corporation believes that to permit its customers to plan for their requirements, it must maintain a constant dialog with them regarding their needs, and its future product plans.

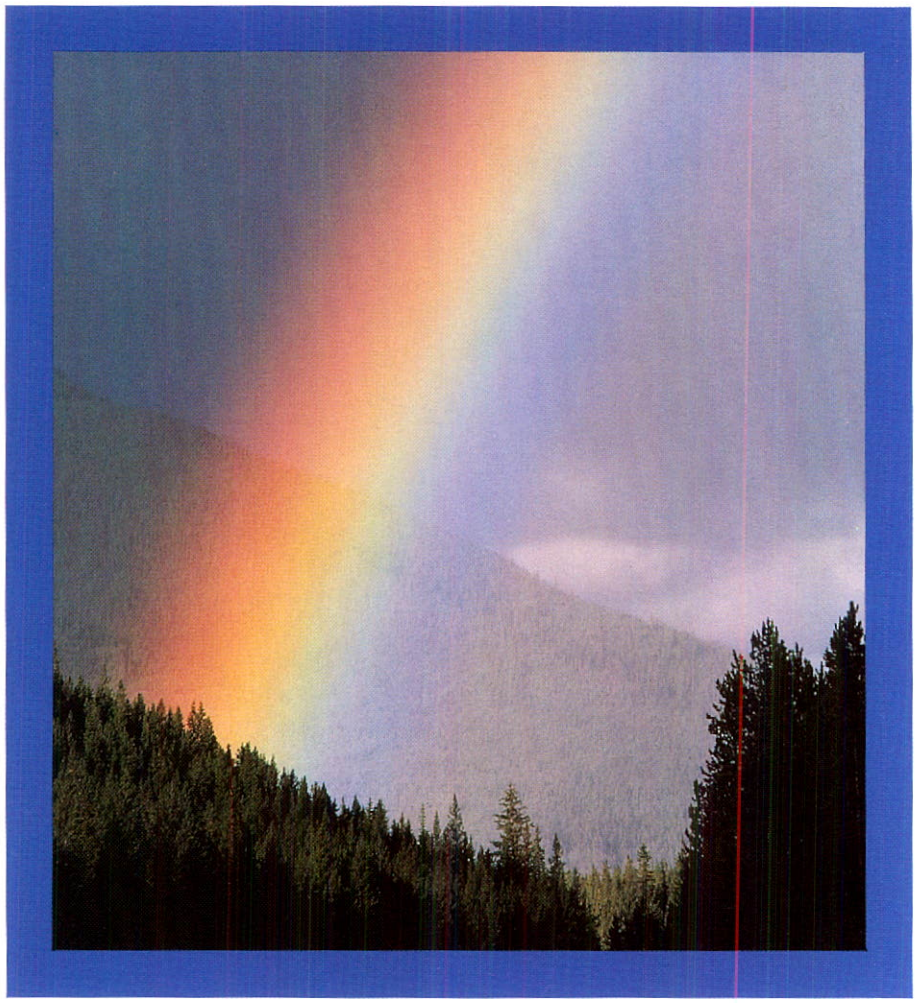
For example, in 1976, Northern Telecom hosted a seminar for the telecommunications industry at which it announced its plans for the Digital World. The corporation stated that it had progressed in developing digital, semiconductor, and software technologies to where it could confidently commit to a five-year program to introduce a complete range of fully digital switching and transmission systems. These would make it economically practical and advantageous for the telecommunications industry to progress from analog toward digital as the basis of the network.

Since the Digital World announcement, Northern Telecom has introduced a steady stream of new digital systems and feature enhancements on or ahead of announced commitments. Examples include the DMS switching and transmission systems; SL Family of PBXs and data packet switches; the DRS-8 microwave radio; fiber optics systems; and other transmission products.

Following Northern Telecom's lead, virtually every major telecommunications equipment supplier in the world has since announced digital systems.

Information management systems must be acceptable and attractive to the people who are expected to use them. Northern Telecom applied years of human factors research in designing the Displayphone, the world's first integrated voice and data terminal. This Displayphone (bottom right) is a new model to be introduced in early 1983. It was designed as a terminal for the SL-1, incorporating many of the features also available on the SL-1's specially designed electronic telephone sets.

Congeniality



Northern Telecom believes it has maintained a lead of about two years in the telecommunications industry with probably the broadest and most advanced line of digital systems available today in the world. It has in-service or on order fully digital systems to serve more than 10 million equivalent telephone lines, a level unmatched by any competitor.

In 1979, Northern Telecom described its concept of the Intelligent Universe, which would evolve from the application of digital technology. Using intelligent terminals linked by global communications networks, people around the world will be able to exchange, share, manipulate, organize, store, and access information on an instant basis from anywhere in the world.

The OPEN World is a step towards the Intelligent Universe.

The five Cs

Northern Telecom's OPEN World includes five key criteria which it believes information systems should meet. The five criteria are a part of the corporation's proposed planning framework to assist organizations in their evaluation of information management systems and the ability of these systems to meet their current and future requirements. Northern Telecom is committed to meeting these criteria in its OPEN World offerings.

The five criteria–called the five Cs–are: control; cost-effectiveness; congeniality; continuity; and compatibility.

Control

An organization–not its supplier–must be able to determine the optimum use and configuration of its information management system.

Cost-effectiveness

An information management system must provide significant, quantifiable economic advantages to an organization. The elements of information management systems usually represent substantial capital investments. To be cost-effective, it must be evident that the system will provide immediate and long-term benefits and investment returns.

Congeniality

Congenial is defined by Webster's New Collegiate Dictionary as meaning "agreeably suited to one's nature," or "existing or associated together harmoniously." Information management systems must be acceptable and attractive to the people who are expected to use them.

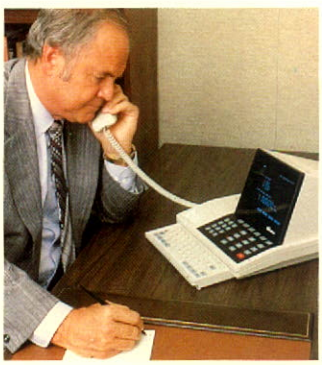
Continuity

In the data processing industry, for example, it has often been the practice of some manufacturers to design a new system using the latest technology, bring it to market, and render obsolete previous generations of systems.

It is relatively easy to plan the introduction of new generations of systems which will obsolete the previous ones. It is somewhat more difficult to evolve systems' capabilities and at the same time avoid obsolescence. However, Northern Telecom has already demonstrated this is possible.

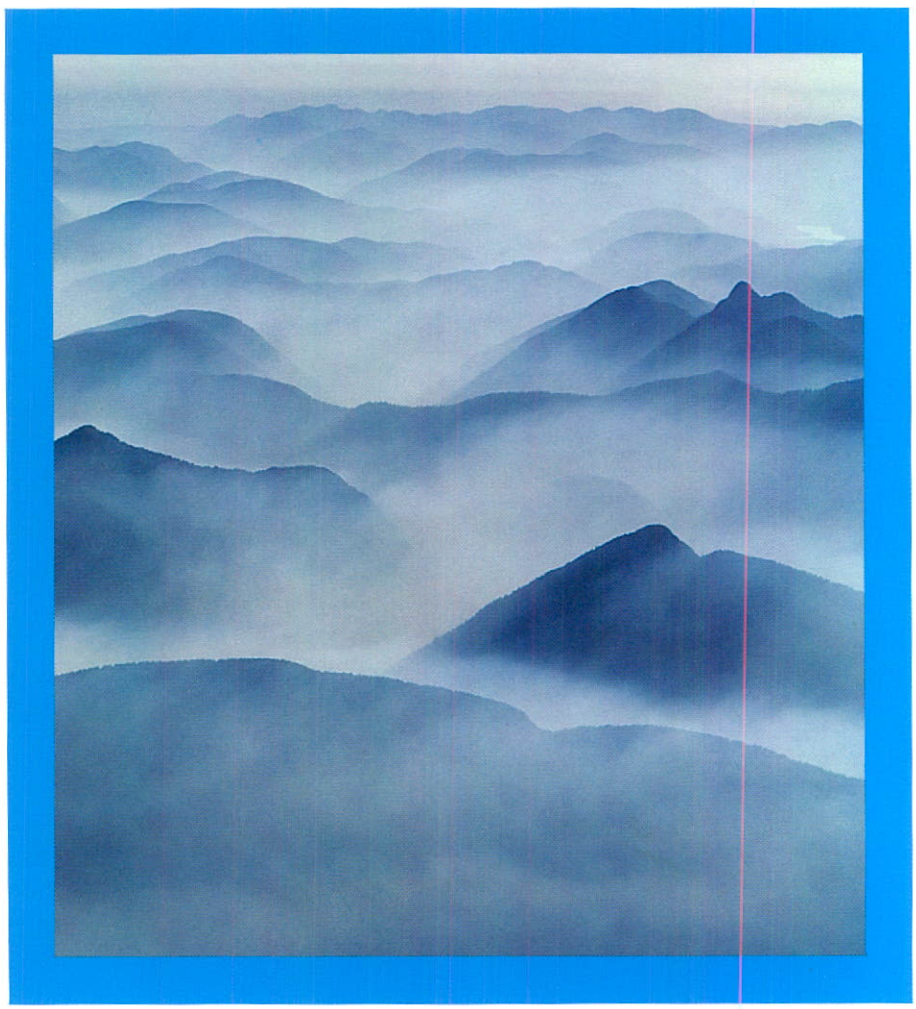
Continuity is a highly desirable attribute. Since information management systems can represent multi-million dollar investments by organizations, an investment could not qualify as cost-effective if it could become obsolete in a relatively short time of perhaps three years.

Further, the longer a system can remain technologically up-to-date, the greater its value becomes. The user becomes increasingly familiar and comfortable with it, identifying new applications it can serve. The system can demonstrate proven reliability and performance compared with new products being launched into the market. And, most importantly, as more software is developed for it, the system's capabilities and value are substantially enhanced.



Continuity

Information management systems should be able to accommodate new technology and the future needs of an organization. In designing its DMS and SL families, Northern Telecom avoided obsolescence by providing for advances in technology with modular hardware and software. Product capabilities can evolve in a continuous flow; previously installed systems can be updated so they can offer the same advanced capabilities as newer models. In the first quarter of 1983, for example, Northern Telecom will introduce Integrated Messaging Service (bottom right) for the SL-1.



Northern Telecom's DMS and SL switches exemplify product design continuity. In designing these product families, Northern Telecom's research and development subsidiary, Bell-Northern Research Ltd. (BNR), recognized the issues of rapidly advancing technologies, and provided for them with a modular architecture for the hardware and software. It is, therefore, relatively easy for Northern Telecom to evolve these product designs in a continuous stream as the technology evolves. For example, software-driven features can be added simply by introducing new modules of software.

This modularity means that it is possible to return to a DMS or SL system, installed years before, and to update the modules in it. It then becomes a new system that is as advanced in its capabilities as any new system Northern Telecom or its competitors can offer.

For example, when introduced, an SL-1 PBX's memory card held about 4,000 words. Today's SL-1 memory card holds 64,000 words. By the end of 1983, this will be increased to 192,000 words. This reduces the number of memory cards needed in a comparably sized system, resulting in lower cost and higher reliability.

Another example is that the SL-1's brain, or central processing unit (CPU), initially consisted of three boards. Today, the CPU is being reduced to just a single board. It has also been increased in power. The CPU used today is five times faster than the one used when the SL-1 was introduced, allowing greater capacity and increased features. These are but two of a number of hardware examples; the ability to evolve the software is of greater significance.

Northern Telecom's biggest competitive advantage lies in its software. Software may represent as much as 85 percent of the development cost of a DMS or SL system. A new entrant in the market may be able to design competitive hardware. However, software must be painstakingly developed feature-by-feature, layer-by-layer. The development of reliable software has been the Achilles heel of many companies in the telecommunications, data processing, and office equipment industries.

The SL-1's software-driven features have been increased from 115 in 1976 to about 350 in 1982 and will number more than 400 in 1984. The DMS-100 Family of large digital switches had 200 available features at the time of its introduction in 1979. In 1982, these exceeded 1,000 and will surpass 1,500 in 1984.

Compatibility

Today, there are all manner of terminals, computers, word processors, local area network communications systems, and other elements of information management systems that cannot effectively communicate with each other. Compatibility between these systems is essential to effective information management.

A solution is a standard communications architecture of compatible protocols. This has been internationally recognized for some time. One such standard structure that has been identified is called OSI, or Open Systems Interconnection. The word "open" means that systems from different manufacturers are able to communicate.

OSI is being developed and promoted by two organizations. Northern Telecom is active in both. The first is the International Standards Organization, which comprises users, computer manufacturers, and telecommunications companies. The second is the International Consultative Committee on Telephone and Telegraph, or CCITT. It is based in Geneva and is chartered by the United Nations to provide a standards setting forum for carriers and telecommunications manufacturers.

The OPEN World

Northern Telecom has made the following commitments to support the OPEN World.

Northern Telecom's SL PBXs can support data terminals operating at up to 19.2 kilobits

Effective information management systems must be able to link diverse products and systems provided by many different manufacturers. Northern Telecom's SL-10 data packet switching system, for example, can interpret the languages used by different computers and terminals into a common format called X.25, making it possible for different systems to exchange information. SL-10-based networks have been installed in Canada, the U.S., the U.K., Belgium, Switzerland, West Germany, Hong Kong, Portugal, and Austria (bottom right).

Compatibility

(thousand of bits of information sent per second) on an asynchronous basis. In the first quarter of 1983, Northern Telecom will introduce a module which will permit data to be transmitted and switched through the SL PBXs at speeds of up to 56 kilobits synchronously.

In 1982, the corporation began commercial shipments of the Displayphone, the first integrated voice and data communications terminal to be introduced in the world.

In early 1983, new versions of the Displayphone, integrating SL-1 features, will be available for use with the PBX. In 1984, Northern Telecom will introduce fully digital voice and integrated voice/data terminals. This will be followed in 1985 by fully digital, high-resolution image and graphic terminals. These terminals will have display screens larger than the Displayphone's, a keyboard for full-time professional use, and many other features. In 1985, Northern Telecom will introduce a more powerful terminal which will include graphics and image capability, as well as voice and text.

High-speed transmission

Bandwidth is a term used to describe the rate at which digitally encoded information can be transmitted. Bandwidth is a very important measure since it determines the speed, the type, and sometimes the quality of information that can be transferred. Today's terminals generally communicate with computers at rates of 1,200 to 9,600 bits per second.

Digital voice communications has been standardized at 64,000 bits per second. That is the rate at which the analog voice signal is sampled, converted to a digital signal, and transmitted.

The modern digital PBX, such as the SL-1 or SL-100, has been designed to handle the voice requirement at 64,000 bits per second. Therefore, the digital PBX can handle most of today's other services since they have lower bandwidth requirements.

But, what of the future?

Voice conversations use most of the bandwidth available today. Voice usage is increasing slowly, but it is, and will continue to be, the most dominant form of office communications. While data usage (which is most often terminal-to-computer communications with low-bandwidth requirements per user) is quite modest today, it is growing rapidly.

Today's configurations of distributed terminals and centralized mainframe computers will continue to be common in the future.

The decreasing cost of computing power and memory is accelerating the increase in, and use of, distributed data processing systems and personal computers. Distributed computers will increasingly need to communicate with each other and with other systems.

This will result in the emergence of new types of office communications. Such information exchanges, and demand for image and graphics communications will require very-high bandwidth, typically in excess of one million bits per second, or one megabit. This type of information communications has another important characteristic—it is transmitted in bursts rather than as a continuous stream.

A future office communications system will therefore need these additional attributes.

It would provide: a very large amount of bandwidth to carry the voice traffic; a modest amount of bandwidth to handle the terminal-to-computer communications; and a modest amount of continuous bandwidth, which is available at high, instantaneous speeds to accommodate the bursts of distributed personal computing traffic.

There is no single system available today with all these attributes.

Today's digital PBX is designed to accommodate voice and low-bandwidth data traffic. The emerging local area networks (LANs) based on coaxial cable, are designed to accommodate the high-bandwidth traffic bursts of distributed computing.

However, there is a multiple system configuration which is optimal for today's requirements and which can migrate to an integrated solution for the future.

First, digital PBXs provide what is known as a centralized, or star configuration. They use twisted-pair telephone wiring commonly found throughout every office building right to each desk. The centralized configuration makes such networks easy to administer. PBXs are circuit switches. That is, they connect two points physically together for the duration of a call and allocate to them a standard, fixed amount of bandwidth.

PBXs provide full connectivity, allowing any station to connect to any other station or to outside lines. They have been designed to meet the stringent reliability requirements of the telephone industry. Because each terminal has its own individual connection into the PBX, terminal failures are isolated from the central system.

The total capacity of today's digital PBX is several hundred megabits, enough to handle thousands of voice and data devices.

PBXs adhere to commonly accepted standards and can support telephone instruments, data terminals, and computers, and they can function as an integral part of the international telecommunications network.

LANs also have a role to play. LANs are typically based around a single coaxial cable that carries all the communications between different points, or stations. They accommodate up to a few hundred stations, each with a tap on to the cable and each with its own complex logic circuit to permit it to transmit and receive information from the shared cable medium.

LANs are packet switches. That is, they transfer bursts of information from many stations, individually packaged and all intermixed on the cable. This is often a fine way to transmit data.

LANs also provide connectivity among terminals. Most LANs broadcast the information from each station to all other stations, and only the addressed destination stations will receive it from the cable. A contention problem may arise when many stations wishing to use the cable, try to broadcast at the same time.

Because of the limited total bandwidth of a single cable, most LANs do not have sufficient capacity to carry the high volume of voice traffic in offices. For example, a 10 megabits network would be overloaded by fewer than 100 simultaneous telephone conversations. Further, the protocols used in most LANs can cause lengthy and variable delays which render unacceptable the voice transmission quality.

Nevertheless, LANs are needed to handle high-bandwidth data communications.

Northern Telecom believes there will be a need in the future for a high-capacity connection–or a wide information pipeline–in the office to every desk. It will be used for Northern Telecom's new terminals (and those supplied by other manufacturers) for graphics and for fast-fill of data on display screens. It will enable anyone to put a single terminal on the desk for enhanced multi-media communications. The OPEN World includes such a pipeline to be provided in stages.

First, in late 1984, Northern Telecom will add a modular enhancement to the SL PBXs. This will provide a digital connection to virtually every desk with a capacity of up to 64,000 bits per second for data and voice.

To reduce, or in many cases eliminate, the need for the redundant and therefore expensive separate wiring of the coaxial cable-based local area network, in 1985 the corporation will substantially increase the bandwidth of the pipeline. BNR has demonstrated in the lab that the telephone wiring already in buildings is capable of carrying data at speeds in excess of one million bits per second. This will make the telephone system a powerful local area network capable of handling most information management needs.

There will continue to be cases where LANs will play a role for very high-speed data transfer. By providing a standard, low-bandwidth gateway connection to the more widely accepted LANs, Northern Telecom will make it easy for terminals connected to the LANs to access–cost-effectively through the PBX–terminals connected on other LANs. This will permit personal computers or other types of terminals on the LANs to have access to external data networks and resources through the SL PBX.

Compatibility in the OPEN World

Northern Telecom will also provide connectivity to and compatibility with other vendors' products and systems.

First, for example, the corporation is committed to support of the X.25 data communications protocol. Northern Telecom played a major role in helping X.25 gain worldwide acceptance. It is used by the SL-10 data packet switching system.

A second example is that Northern Telecom will provide for the support of the OSI architecture and selected protocols such as those used for IBM's proprietary Systems Network Architecture (SNA).

In addition, the corporation has taken the innovative step of offering to other vendors an interface license for a one-time, nominal fee, giving them the asynchronous data interface specifications for SL-1. This will enable them to design their equipment to work more efficiently and cost-effectively with Northern Telecom's PBXs. For example, their systems could be linked directly to the SL PBX without using an Add-on Data Module. Other interface licenses will also be offered.

Northern Telecom will also work closely with leading manufacturers of data processing and office automation equipment to ensure the most effective integration of its systems with their equipment. The corporation has announced agreements with Sperry Univac, Data General, and Digital Equipment Corporation. Negotiations are in progress with other vendors.

OPEN World services

In addition to these and other products, Northern Telecom also plans to offer an array of other OPEN World services to facilitate information management. These generally will be implemented by software.

The first is Integrated Messaging Service (IMS). Calls and messages can be recorded in a central file. This will do away with the need for telephone message slips. IMS shipments will begin in the first quarter of 1983.

A much wider array of services will be made available following the introduction in late 1984 of a special, wide-bandwidth application processor for the SL Family PBXs. This module will provide the storage and processing required to provide these services. It will make it possible to offer such additional services as teleconferencing, starting with improved quality voice conferencing and extending to multi-media conferencing. Users will be able to talk simultaneously and share text, graphics and image in a highly interactive desk-to-desk teleconference session. Northern Telecom will later add multi-media messaging, advanced data base management systems, and other services to be announced.

Many of the features of the SL Family, will also be available as features and services provided as a part of the Integrated Business Services capabilities of the DMS-100 Family of switches. This will make it possible for telecommunications companies to tailor offerings for a customer or group of customers using the public network, although it would appear to the user as having the characteristics of a private, dedicated system.

Effective information management

As organizations become increasingly aware of the importance of effective information management systems, exciting market opportunities are developing for those companies able to provide systems to meet their needs.

The OPEN World means that organizations are free to choose diverse equipment and systems that are best suited to their particular information management needs. They can be confident of being able to connect these systems to their networks, achieving easy and immediate access to, and communications of, information in any form they desire.

The OPEN World is an extension of Northern Telecom's proven expertise in the key areas of digital technology, semiconductors, software, and communications capability. Accordingly, Northern Telecom is confident of its leadership in this market. The corporation expects that its revenues derived from OPEN World products, features, and services will amount to about $13 billion in the five-year period of 1983-1987.

Financial review

In 1982, Northern Telecom's consolidated revenues for the first time exceeded the $3 billion level. Led by demand for transmission equipment and digital central office and private branch exchange (PBX) switching systems, the corporation achieved an 18.1 percent increase in consolidated revenues to $3.036 billion in 1982, compared with $2.571 billion in 1981 and $2.055 billion in 1980. These increases have been primarily attributable to volume growth rather than price increases.

Major growth in the U.S.

On a geographic basis (the location of the selling organization), U.S. revenues rose 40.7 percent in 1982 to $1.473 billion or 48.5 percent of consolidated revenues. In 1981, the U.S. accounted for 40.7 percent of consolidated revenues, or $1.047 billion; in 1980, the U.S. was 39.3 percent of the total, or $807 million.

The growth in the U.S. market has been mainly attributable to the success of several product lines, particularly DMS digital switches sold to telephone companies, including American Telephone and Telegraph (AT&T) operating companies; the SL Family of digital PBXs; various analog and digital transmission products; network systems, including tandem switches sold to specialized and resale common carriers, the U.S. military, and private organizations; and telephone apparatus, such as the Imagination line of decorative telephones.

Canadian revenues in 1982 were up 4.3 percent at $1.392 billion (45.9 percent of the total) from $1.335 billion (51.9 percent of consolidated revenues) in 1981. In 1980, Canada accounted for $1.084 billion, or 52.7 percent of total revenues. Demand in Canada was curtailed during the year by the deterioration of the country's economic performance and resulting cutbacks in capital spending by telephone companies, including Bell Canada.

Capital spending by telephone companies in Canada was up only marginally in 1982 compared with 1981, representing an actual decline in volume purchased. Reflecting a continuation of these conditions, the corporation expects at least a 14 percent reduction in capital spending in 1983 by its principal Canadian customers, the telephone companies, and anticipates a significant decline in its revenues and earnings in Canada. The corporation is taking steps to offset the impact of this decline in revenues on its margins.

Revenues outside of North America were $169.8 million (5.6 percent of consolidated revenues) in 1982, compared with $189.3 million (7.4 percent of the total) in 1981, and $163.6 million (eight percent of the total) in 1980. The decline in 1982 in international revenues occurred because significant export revenues were reported in Canada.

While the financial statements indicate revenues by location of the selling organization (point of origin), it is also worthwhile to examine the business by the markets where the products are bought.

Measured by destination (where the customers are located), international revenues increased significantly. Revenues from customers outside of North America rose 19.9 percent to $325.2 million (10.7 percent of the total) in 1982, compared with $271.2 million (10.6 percent of consolidated revenues) in 1981; in 1980, international revenues were $242.6 million (11.8 percent of the total). Major factors accounting for the increase included sales of digital transmission equipment from Canada to South Korea and increased sales of SL-1s and SL-10 data packet switching systems, particularly in Europe.

U.S. revenues rose 39 percent in 1982 to $1.462 billion (48.2 percent of the total). In 1981, U.S. revenues were $1.052 billion (40.9 percent of the total), compared with $793.7 million (38.6 percent of consolidated revenues) in 1980.

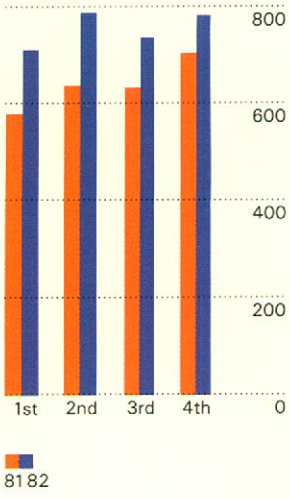
Revenues in Canada in 1982 were $1.248 billion, or 41.1 percent of the total, virtually unchanged from 1981 when Canada accounted for 48.5 percent of consolidated revenues, and compared with $1.018 billion in 1980 (49.6 percent of the total).

Telecommunications up 19.6 percent

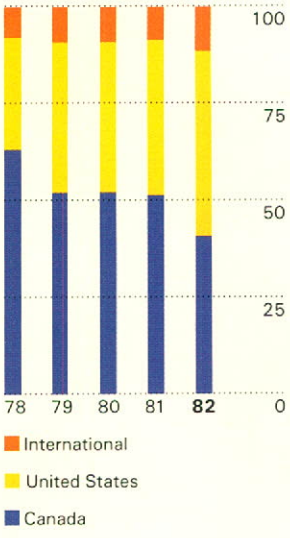
Telecommunications equipment revenues in 1982 were $2.689 billion, up 19.6 percent from $2.249 billion in 1981; revenues in 1980 were $1.751 billion.

Central office switching was up 16.5 percent in 1982 to $904.3 million, compared with $776 million in 1981; switching accounted for $505.1 million in 1980. This growth was attributable to continuing strong demand for DMS (Digital Multiplex System) switches, particularly the DMS-100 Family of large switches. Shipments increased most significantly in the U.S., where demand also rose for the smaller DMS-10 switches. DMS revenues in 1982 were $646 million, up 24 percent from $521 million in 1981, and compared with $269 million in 1980.

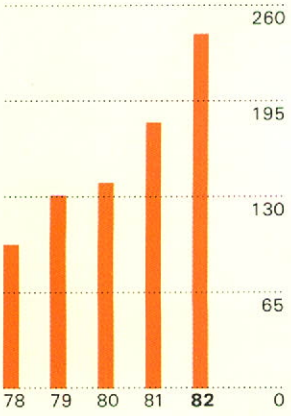
Quarterly revenues
($ millions)



Total revenues by customer location
(percent)



Research and development net expenditures
($ millions)



This growth has been offset somewhat by declining demand for analog switching, mainly comprising sales of additional equipment for exports and for switches installed in previous years. Reflecting the economic and technical superiority of digital systems, telephone companies have increasingly chosen to install new digital systems rather than purchase new analog switches or to increase the capacity of previously installed analog switches.

Subscriber apparatus, business communications and network systems revenues were up 29.6 percent in 1982 to $958.7 million, compared with $739.9 million in 1981. In 1980, this product line accounted for $618.6 million, or 30.1 percent of the total.

Increased sales of the SL Family, network systems, and subscriber apparatus in the U.S. were the major contributors to the 1982 increase. These gains were offset, in part, by a drop in sales for apparatus and key telephone systems in Canada. In 1982, consolidated SL-1 revenues were about $480 million, up more than 51 percent from $318 million in 1981. The SL-10 data packet switching systems recorded revenues of $36 million in 1982, up from $26.6 million in 1981.

Transmission achieved the largest gain in 1982, rising 30.6 percent to $534.1 million. In 1981, transmission revenues were $409 million, compared with $277.6 million in 1980. The growth was the result of increased sales of systems in all markets. The most significant gains were recorded by sales of digital channel banks, multiplex equipment in the U.S., microwave radio sales in Canada, the DMS-1 subscriber carrier system, and optical systems. Sales of optical systems increased to $37.3 million, compared with $21.2 million in 1981.

Test equipment revenues, included in transmission, amounted to $64.7 million compared with $59.4 million in 1981.

Wire, cable, and outside plant revenues at $291.5 million in 1982, were down 9.9 percent from the 1981 level of $323.6 million, and compared with $349.9 million in 1980. Lower revenues for this product line were primarily due to reduced purchases by Canadian telephone companies and lower copper prices. The phasing out of the corporation's power cable operations in 1980 and early 1981 affected revenues in those years. Revenues of outside plant products in the U.S. increased in 1982.

Bell Canada, its telephone subsidiary and associated companies accounted for $913.8 million or 30.1 percent of Northern Telecom's consolidated 1982 revenues, compared with $911.7 million or 35.5 percent in 1981; in 1980, revenues from this group amounted to $722.2 million or 35.2 percent of the total.

Electronic office systems

Electronic office systems (EOS) revenues were up 4.9 percent to $287.7 million in 1982, compared with $274.2 million in 1981; in 1980, EOS revenues were $259 million.

In 1982, as in the previous years, there was a continuing decline in revenues generated by older equipment leased to customers. This was offset by revenues from new products and systems introduced during 1981 and 1982. In particular, these included the Models 585 and 503 distributed data processing systems, Model 290 series of on-line data entry systems, and the Displayphone integrated voice and data terminal.

In the latter part of 1982, the EOS business was reorganized and made a part of the new Terminal Systems group, which also includes the Advanced Telephone Products division. Terminal Systems has been combined with Business Communications Systems, Network Systems, and the Spectron test equipment division to form the new Integrated Office Systems (IOS) organization as a part of the telecommunications segment. Therefore, in 1983, EOS will not be reported as a distinct segment.

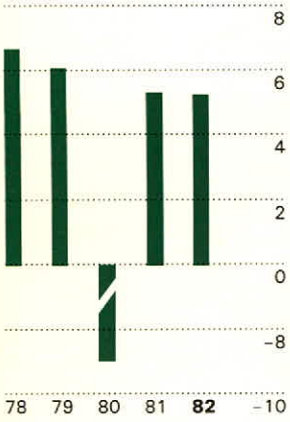
Gross margin increases

The corporation's gross margin in 1982 rose to 30.5 percent on increased gross profit of $926.2 million. This compared with a 1981 gross margin of 28.3 percent on gross profit of $728.5 million, and a margin in 1980 of 24.5 percent on gross profit of $504.1 million.

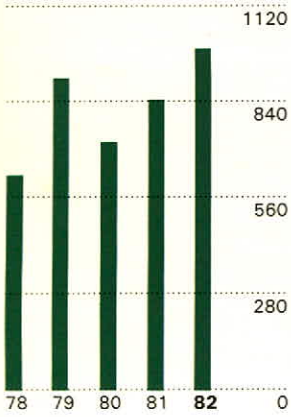
The improving gross margin in 1981 and 1982 reflects, in particular, the increasing profitability of such key products as the DMS and SL switching systems and transmission equipment. The impact of inflation on production costs was offset by the success of the corporation's on-going cost reduction and productivity programs, volume increases, and some impact from higher prices.

DMS turned profitable in the first quarter 1981. For 1982, DMS gross profit margins were equal to or better than the margins achieved by prior generations of central office switching systems and were higher than the overall corporate gross margin.

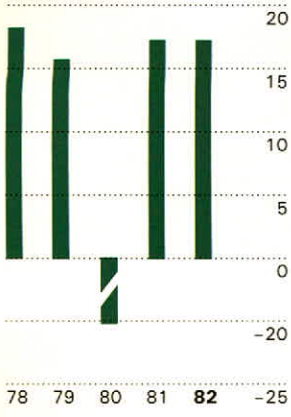
Net earnings per revenue dollar
(cents)



Shareholders' equity
($ millions)



Return on average shareholders' equity
(percent)



The improvement in gross margins attributable to the telecommunications product lines was somewhat offset by a considerably lower gross margin in the EOS business. EOS results were substantially affected by a series of actions taken during the year to restructure the business to improve its future productivity and performance and related to its merger into the new IOS organization.

These actions included expenses or provisions for the closing of four manufacturing plants; reduction of employment by 650; the full depreciation of the lease base related to older equipment; and the write-down of inventories.

In 1980, gross profit was adversely affected by the high start-up costs for DMS and by provisions and expenses incurred by the EOS business.

SG&A expenses up

Selling, general and administrative expenses (SG&A) amounted to $461.9 million in 1982, up 28.6 percent from $359.3 million in 1981, and compared with $341.5 million in 1980. The increases are in part the result of costs associated with achieving higher revenues and the build-up of the IOS sales and service organization. SG&A represented 15.2 percent of consolidated revenues in 1982, compared with 14 percent in 1981, and 16.6 percent in 1980.

Other factors accounting for the increase in SG&A as a percentage of revenues include the effects of the expenses and provisions associated with the EOS business; higher wages and other employee-related costs; and provisions made under a program implemented in Canada to encourage early retirements in recognition of the reduced level of manufacturing required to meet the drop in demand expected in 1983 from Canadian telephone companies.

The lower 1981 percentage of SG&A to revenues reflected a higher level of revenues and improved control of SG&A, particularly in the EOS business. The 1980 SG&A percentage reflects, in part, certain restructuring and related costs incurred by the EOS business.

R&D investment up 32.9 percent

In 1982, Northern Telecom increased its net investment in research and development by 32.9 percent to $241.4 million, or eight percent of consolidated revenues, compared with $181.6 million, or 7.1 percent of revenues invested in 1981. In 1980, net R&D expense was $140.9 million, or 6.9 percent of revenues.

The increased rate of R&D investment in 1982 resulted from a decision taken by the corporation to raise the percentage of revenues annually devoted to the evolution of established products and development of new systems. In 1983, Northern Telecom expects to invest about $285 million in R&D.

Operating earnings up 18.8 percent

The higher level of R&D and SG&A expenses in 1982 offset the improved gross margin. Nevertheless, operating earnings for the year increased more than consolidated revenues. Operating earnings were $222.9 million, up 18.8 percent from $187.6 million in 1981, and compared with operating profits in 1980 of $21.7 million. Operating margins in the three years were 7.3 percent, 7.3 percent, and 1.1 percent, respectively.

Segment operating earnings

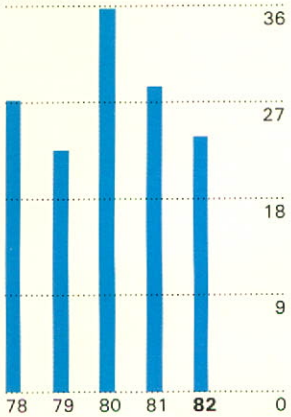
The telecommunications equipment segment (see note 18 on page 42) operating earnings were up 44.9 percent to $437.4 million in 1982, compared with $301.8 million in 1981, and $187.4 million in 1980. EOS recorded an operating loss in 1982 of $98.5 million, compared with losses in 1981 and 1980 of $15.7 million and $86.7 million, respectively.

Operating earnings for these business segments do not include general corporate expenses. These expenses rose in 1982 to $126.3 million, compared with $100.6 million in 1981, and $82.5 million in 1980. Higher salary and benefits costs were the principal reasons for the increases.

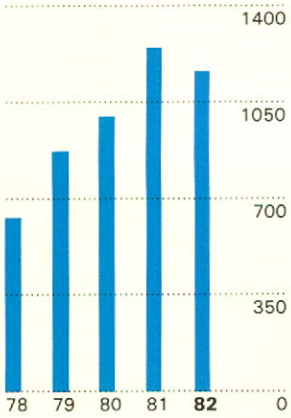
On a geographic basis (location of the selling organization), Canadian operating earnings, mainly derived from the sale of telecommunications equipment, rose 9.9 percent to $357.1 million, compared with $325 million in 1981; in 1980, they were $253.5 million.

U.S. operations, including the EOS business, recorded operating earnings of $195.5 million in 1982, up 70.6 percent from $114.6 million in 1981, and compared with an operating loss in 1980 of $37.1 million. Operating earnings on a geographic basis do not include general corporate or R&D expenses.

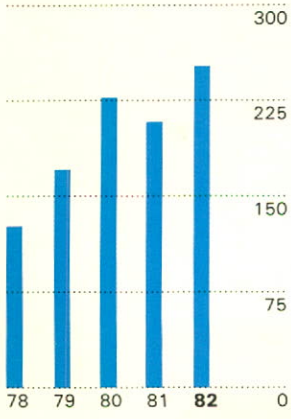
Total debt as a percentage of total capitalization
(percent)



Order backlog
($ millions)



Capital expenditures
($ millions)



Lower interest expense

A lower average level of outstanding debt, declining interest rates and a greater proportion of fixed-term borrowings resulted in a decline in interest expense in 1982 to $39.6 million, compared with $64.2 million in 1981, and $44.9 million in 1980. The higher level of 1981 expense compared with 1980 was caused by increased average borrowings and historically high interest rates.

Total long-term debt outstanding at yearend 1982 was $340.3 million, up $22.3 million from a year earlier. Notes payable at $1.3 million, was $58.1 million lower than at the end of 1981.

Income taxes

The 1982 provision for income taxes was $60.4 million, or 28.5 percent of pre-tax earnings, compared with $35.8 million, or 22.9 percent of pre-tax earnings in 1981, and $7.5 million in 1980. The effective 1982 and 1981 tax rates reflect the difference between Canadian statutory rates and those applicable to the profits of non-North American operations, as well as certain Canadian income tax incentives. The increase in the effective 1982 tax rate reflects higher levels of earnings in the U.S.

At yearend 1982, subsidiaries in the U.S. had tax loss carryforwards for accounting purposes of $100.1 million on which tax effects have not been recognized in the accounts and are available to reduce taxable income in future years.

Extraordinary items

In the third and fourth quarters of 1982, the corporation began to use its tax loss carryforwards, resulting in an extraordinary gain for the year of $7 million, or $0.20 per share. These tax loss carryforwards were applied as a reduction of income taxes.

In the first quarter 1981, the corporation recorded an extraordinary gain of $16 million, or $0.46 per share, on the sale of an investment in the shares of Intersil, Inc.

In the fourth quarter 1980, the corporation recorded an extraordinary loss of $163.8 million comprising a writeoff of $106.4 million of unamortized goodwill and technology investments, and $57.4 million of after-tax expense provisions for the discontinuance of certain EOS operations.

The extraordinary gain in 1981 and extraordinary loss in 1980 would not be reported as extraordinary items under U.S. generally accepted accounting principles.

Record net earnings

Net earnings, before extraordinary gains, rose 25.3 percent in 1982 to a record $151.2 million, or $4.30 per share, compared with $120.7 million, or $3.49 per share in 1981. In 1980, before the extraordinary loss, Northern Telecom recorded a net loss of $21.4 million, or $0.63 per share.

Including the extraordinary gains, 1982 net earnings were $158.2 million, or $4.50 per share, compared with 1981 net earnings of $136.7 million, or $3.95 per share. In 1980, after recording the extraordinary loss, the corporation's net loss was $185.2 million, or $5.48 per share.

The return on average shareholders' equity in 1982 was 17.1 percent, compared with 17.2 percent in 1981, and a negative return in 1980.

Return on average invested capital in 1982 was 14.5 percent, compared with 13.6 percent in 1981, and a 0.5 percent return in 1980.

Book value of the corporation's common shares was $28.33 at yearend 1982, compared with $24.42 and $21.15 at yearend 1981 and 1980, respectively.

Liquidity and capital resources

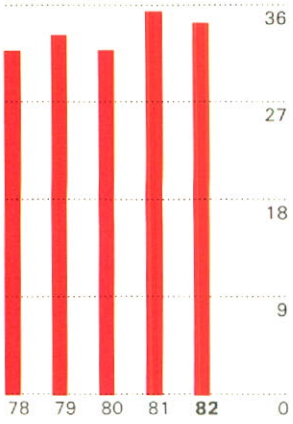
In 1982, working capital provided by operations, excluding extraordinary items, was $262.7 million compared with $169 million in 1981 and $48.7 million in 1980.

Working capital increased in 1982 by $135.4 million to $636.9 million, compared with an increase of $48.8 million to $501.5 million at yearend 1981, and following a decrease in 1980 of $104.2 million to $452.7 million at yearend. The current ratio was 1.94:1 at yearend 1982; 1.75:1, and 1.76:1 at yearend 1981 and 1980, respectively.

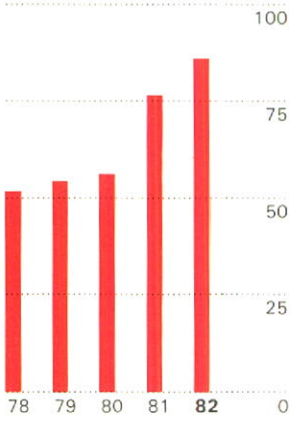
Capital expenditures in 1982, including additions to the leasebase, amounted to $252.6 million in 1982, $209.6 million in 1981, and $225.6 million in 1980. In 1983, the corporation expects to increase its capital spending to about $310 million.

Capital requirements in 1983 will be met principally from cash and short-term investments and internally generated funds, although Northern Telecom will continue to take advantage of attractive financing opportunities that it may identify.

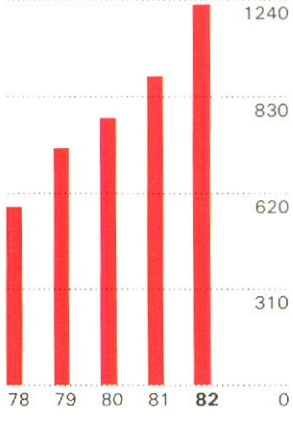
Number of employees
(thousands)



Revenues per employee
($ thousands)



Total compensation
($ millions)



Cash and short-term investments increased during 1982 by $123.5 million to $149.6 million. In 1982, the corporation's R&D subsidiary, Bell-Northern Research (BNR), received $70 million from investors under the terms of Scientific Research Investment Contracts (SRICs) to fund a portion of the corporation's 1982 R&D program. In July 1981, BNR received $20 million from investors under SRICs to fund a portion of its 1981 R&D program.

In June, Northern Telecom privately placed US$25 million ($32.3 million) 9¼ percent subordinated seven-year notes with warrants to purchase 500,000 common shares of the corporation at US$46.25. The exercise premium at the time of the issue was 27 percent.

In December 1982, a wholly owned nonconsolidated finance subsidiary of the corporation, Northern Telecom International Finance B.V. of the Netherlands, completed a public offering in Europe of US$80 million ($99.3 million) seven percent convertible subordinated debentures due 1997. The debentures are guaranteed by the corporation and are convertible into the corporation's common shares after March 20, 1983, at US$73.00, and represented a conversion premium of 18.22 percent at the time of the issue. The holders have the right to tender their debentures in 1987 for redemption at 120 percent of the principal amount. Amounts due to nonconsolidated finance subsidiaries increased in 1982 by $67.7 million.

Through the corporation's Shareholder Dividend Reinvestment and Stock Purchase Plan, $20.4 million of dividends and additional cash were invested in 1982, $20 million in 1981, and $29.6 million in 1980. Those amounts included $19.4 million, $19 million, and $18.5 million, respectively, by Bell Canada, the corporation's majority shareholder. Investment plans for employees raised $7.3 million in 1982 and $3.1 million in 1981 through the issue of the corporation's common shares.

Total long-term debt, including $82.2 million of SRICs, amounted to $340.3 million at yearend 1982, compared with $318 million and $329.4 million at yearend 1981 and 1980, respectively.

Total debt as a percentage of total capitalization was 23.9 percent at the end of 1982, compared with 28.6 percent and 35.8 percent at yearend 1981 and 1980, respectively (total capitalization comprises notes payable, SRICs, total long-term debt, deferred income taxes payable, minority interest, and shareholders' equity).

Backlog declines

The order backlog at December 31, 1982 was $1.173 billion, down $83 million, or 6.6 percent, from the year earlier level of $1.256 billion; the backlog at yearend 1980 was $1.004 billion. The backlogs mainly comprise telecommunications equipment. Historically, orders for central office switching account for the largest portion of the backlog reflecting the time needed following order receipt to produce and deliver these large systems. This, and the continuing strong demand for Northern Telecom's DMS switches, explains why 46 percent of the orders on hand at yearend were for DMS.

Although order input from the U.S. and international markets continued to be strong through the end of 1982, this was more than offset by a significant drop in the Canadian market, reflecting the impact of the economy.

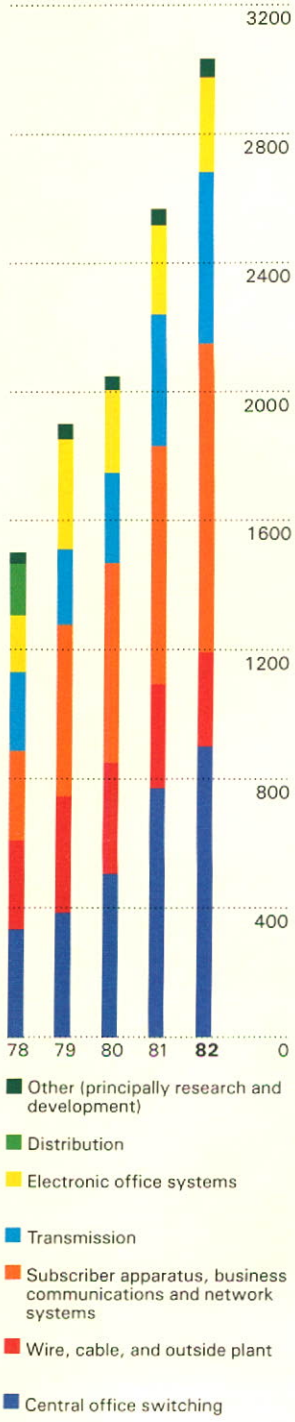
The backlog of orders on hand from U.S. customers was 31 percent higher at yearend 1982 compared with a year earlier and represented 63 percent of the total compared with 45 percent at yearend 1981. The order backlog from Canadian customers was 44 percent lower from yearend 1981, representing 25 percent of the total compared with 41 percent at the end of 1981. The balance of orders was accounted for by international customers.

As a result, the corporation has indicated that it expects only a modest increase in consolidated 1983 revenues from 1982.

Stock hits new high

Northern Telecom's shares are listed on the Montreal, Toronto, Vancouver, and New York stock exchanges. The following table shows the high and low sale prices of the shares on the Montreal and Toronto exchanges (taken together), and as reported on the composite tape in the United States, which includes trading on the New York Stock Exchange. In December 1982, the corporation's shares traded at 88¾ in Canada and 72⅝ on the NYSE, the highest levels since Northern Telecom publicly issued shares in 1973.

Revenues by principal products and services
($ millions)



	Montreal/Toronto (C$)		United States (US$)	
	High	Low	High	Low
1981				
First quarter	40¾	32½	34⅜	27
Second quarter	54½	38½	45¾	32½
Third quarter	52	41	42⅛	34⅜
Fourth quarter	60¼	47	51⅛	39⅛
1982				
First quarter	60½	49	50⅜	40¼
Second quarter	57	44½	46¾	34⅞
Third quarter	54½	41	44⅝	32¾
Fourth quarter	88¾	52	72⅝	42¼

At February 4, 1983, Bell Canada owned 55.4 percent of Northern Telecom's shares. The remaining 44.6 percent of the shares were owned by about 9,796 other shareholders.

Dividends

In 1982 and 1981, Northern Telecom paid a cash dividend each quarter of $0.25 per share, for a total of $1.00 per share each year. The total amounts paid out as dividends in 1982 and 1981 were $35.1 million and $34.7 million, respectively. The corporation's dividends are declared in Canadian funds; shareholders may choose to receive payment in U.S. funds (based on a conversion rate). Shareholders may invest dividends and optional cash payments under the Shareholder Dividend Reinvestment and Stock Purchase Plan.

On January 27, 1983, the Directors approved a first quarter 1983 dividend, payable March 31 of $0.30 per share, a 20 percent increase from the amount paid each quarter during 1982. The Directors also agreed to recommend to the corporation's shareholders a three-for-one division of Northern Telecom's outstanding common shares. The proposed share division will be submitted to shareholders for their approval at the corporation's 1983 annual meeting to be held April 29 in Halifax, Nova Scotia to become effective May 11, 1983.

Northern Telecom intends to continue paying quarterly dividends. The level of future payments will be determined by the Board of Directors based on such considerations as the level of earnings from operations, capital requirements, and the financial condition of the corporation.

Existing legislation and amendments tabled by the Government of Canada in December 1982 establish the withholding tax on dividends paid or credited on Northern Telecom shares at 25 percent (unless reduced by treaty). Under the present United States-Canada Tax Treaty, the rate of withholding tax on Northern Telecom dividends paid or credited to individuals residing in, or corporations organized under the laws of the United States, and not having a ''permanent establishment'' in Canada, is 15 percent.

The present United States-Canada Tax Treaty also states that gains derived in Canada from the sale or exchange of Northern Telecom shares by an individual resident of the United States, or by a corporation or other entity organized under the laws of the United States, are exempt from taxation in Canada provided that the individual or corporation has no ''permanent establishment'' in Canada.

Business segments and principal product lines

(millions of dollars)	**1982**	1981	1980	1979	1978
Revenues					
Telecommunications equipment					
Central office switching	**$ 904.3**	$ 776.0	$ 505.1	$ 386.0	$ 338.9
Subscriber apparatus, business communications and network systems	**958.7**	739.9	618.6	524.7	374.3
Wire, cable, and outside plant	**291.5**	323.6	349.9	366.7	276.6
Transmission	**534.1**	409.0	277.6	227.3	141.3
	2,688.6	2,248.5	1,751.2	1,504.7	1,131.1
Electronic office systems	**287.7**	274.2	259.0	349.8	171.5
Electrical and electronic products distribution*	**–**	–	–	–	162.9
Other (principally research and development)	**59.2**	48.2	44.4	46.0	39.1
Total	**$3,035.5**	$2,570.9	$2,054.6	$1,900.5	$1,504.6
Operating earnings					
Telecommunications equipment	**$ 437.4**	$ 301.8	$ 187.4	$ 234.5	$ 180.9
Electronic office systems	**(98.5)**	(15.7)	(86.7)	26.0	30.0
Electrical and electronic products distribution	**–**	–	–	–	8.9
Other	**10.3**	2.1	3.5	1.7	–
Total	**$ 349.2**	$ 288.2	$ 104.2	$ 262.2	$ 219.8

*Business discontinued effective December 31, 1978.

Consolidated statement of operations

Northern Telecom Limited and subsidiary companies
Year ended December 31
(millions of dollars except per share figures)

	1982	1981	1980
Revenues (note 18)	**$3,035.5**	$2,570.9	$2,054.6
Cost of revenues	**2,109.3**	1,842.4	1,550.5
Gross profit	**926.2**	728.5	504.1
Selling, research and development and general and administrative expenses (note 3)	**703.3**	540.9	482.4
Operating earnings	**222.9**	187.6	21.7
Investment and other income (net) (note 4)	**25.6**	31.1	10.5
Interest charges–long-term debt	**(26.8)**	(41.1)	(20.2)
–other	**(12.8)**	(23.1)	(24.7)
Foreign currency gains (losses)	**2.7**	2.0	(1.2)
Earnings (loss) before income taxes and extraordinary items	**211.6**	156.5	(13.9)
Provision for income taxes (note 5)	**(60.4)**	(35.8)	(7.5)
Earnings (loss) before extraordinary items	**151.2**	120.7	(21.4)
Extraordinary items (notes 2 and 6)	**7.0**	16.0	(163.8)
Net earnings (loss) (note 2)	**$ 158.2**	$ 136.7	$ (185.2)
Earnings (loss) per share* (note 2)			
–before extraordinary items	**$ 4.30**	$ 3.49	$ (0.63)
–after extraordinary items	**$ 4.50**	$ 3.95	$ (5.48)
Dividends declared per common share	**$ 1.00**	$ 1.00	$ 1.00
*Based on weighted average number of common shares outstanding (thousands)	**35,164**	34,629	33,795

Consolidated statement of retained earnings

	1982	1981	1980
Balance at beginning of year	**$356.7**	$254.7	$473.7
Add: Net earnings (loss)	**158.2**	136.7	(185.2)
	514.9	391.4	288.5
Deduct: Dividends	**35.1**	34.7	33.8
Balance at end of year	**$479.8**	$356.7	$254.7

The important differences between Canadian and United States generally accepted accounting principles affecting the Consolidated Statement of Operations are described and reconciled in note 2 of Notes to consolidated financial statements.

The integrity and objectivity of the financial statements and accompanying notes in the annual report are the responsibility of management.

To fulfill this responsibility, Northern Telecom Limited maintains internal control systems to provide reasonable assurance that the books and records, from which the financial statements are derived, accurately reflect all transactions and that established policies and procedures are followed. The internal control systems are supported by regular reviews by internal auditors and by examination of the financial statements by Touche Ross & Co., independent chartered accountants.

The Audit Committee of the Board of Directors meets regularly with the independent chartered accountants and with representatives of management and the internal auditors to approve the scope of audit work and to assess reports on audit work performed. The independent auditors have full access to the Audit Committee, with and without management present. The Audit Committee reviews quarterly and annual financial statements and presents minutes of its meetings to the full Board of Directors for approval.

Consolidated balance sheet

Northern Telecom Limited and subsidiary companies
As at December 31 (millions of dollars)

	Assets	1982	1981
Current	Cash and short-term investments at cost (approximates market value)	**$ 149.6**	$ 26.1
	Accounts receivable		
	Affiliated companies	**59.2**	70.0
	Trade (less provision for uncollectibles $20.4 for 1982 and $8.3 for 1981)	**491.3**	436.2
	Inventories (note 7)	**578.4**	614.9
	Prepaid expenses	**12.3**	10.7
	Deferred income taxes	**24.2**	12.0
		1,315.0	1,169.9
Long-term	Receivables (note 8)	**51.5**	29.0
Investments	Non-consolidated finance subsidiaries (note 9)	**422.6**	353.0
	Associated companies and other	**10.4**	6.5
		433.0	359.5
	Plant and equipment–net (note 10)	**609.0**	559.8
	Goodwill and other assets (notes 1 and 11)	**33.5**	29.1
	Total assets	**$2,442.0**	$2,147.3
	Liabilities		
Current	Notes payable	**$1.3**	$ 59.4
	Accounts payable and accrued liabilities		
	Affiliated companies	**3.2**	.9
	Employees' payroll	**21.9**	15.4
	Vacation pay accrued	**29.9**	26.7
	Interest accrued	**5.7**	12.5
	Trade and other	**507.7**	421.8
	Taxes payable	**63.9**	41.2
	Due to non-consolidated finance subsidiaries (note 9)	**8.9**	30.6
	Scientific research investment contracts due within one year (note 13)	**22.1**	2.8
	Debt instalments due within one year (note 14)	**13.5**	57.1
		678.1	668.4
Long-term	Deferred income	**3.6**	4.7
	Due to non-consolidated finance subsidiaries (note 9)	**365.7**	276.3
	Scientific research investment contracts (note 13)	**60.1**	12.1
	Long-term debt (note 14)	**244.6**	246.0
	Deferred income taxes	**73.1**	74.1
	Minority interest in subsidiary company	**12.6**	12.3
		1,437.8	1,293.9
	Shareholders' equity		
Stated capital	35,450,762 shares outstanding in 1982 and 34,947,544 in 1981 (note 15)	**524.4**	496.7
Retained earnings		**479.8**	356.7
		1,004.2	853.4
	Commitments and contingencies (notes 9 and 17)		
	Total liabilities and shareholders' equity	**$2,442.0**	$2,147.3

On behalf of the Board of Directors

J. H. Moore
Director

Charles Perrault
Director

Consolidated statement of changes in financial position

Northern Telecom Limited and subsidiary companies
Year ended December 31 (millions of dollars)

		1982	1981	1980
Cash and short-term investments were provided by (used in)	Operations	**$326.8**	$ 90.4	$ 41.0
	Investment	**(240.3)**	(132.9)	(210.0)
	Financing	**37.0**	55.2	175.6
	Increase in cash and short-term investments	**123.5**	12.7	6.6
	Cash and short-term investments at beginning of year	**26.1**	13.4	6.8
	Total	**$149.6**	$ 26.1	$ 13.4
Cash provided by operations	Earnings (loss) before extraordinary items	**$151.2**	$120.7	$ (21.4)
	Items not requiring cash			
	Depreciation and amortization	**174.2**	119.8	119.6
	Equity earnings in non-consolidated subsidiaries	**(69.6)**	(58.2)	(58.2)
	Deferred income taxes	**(1.0)**	(12.4)	8.4
	Other	**7.9**	(.9)	.3
	Working capital provided by operations	**262.7**	169.0	48.7
	Extraordinary items	**7.0**	–	(57.4)
	(Increase) decrease in operating net assets	**92.2**	(43.9)	83.5
	Dividends	**(35.1)**	(34.7)	(33.8)
	Total	**$326.8**	$ 90.4	$ 41.0
Cash invested	Expenditures for plant and equipment	**$252.6**	$209.6	$225.6
	Disposals of plant and equipment	**(25.6)**	(28.2)	(34.8)
	Extraordinary item	**–**	(54.8)	–
	Other investments	**13.3**	6.3	19.2
	Total	**$240.3**	$132.9	$210.0
Financing	(Increase) decrease in long-term receivables	**$ (22.5)**	$ 4.1	$ 8.2
	Increase (decrease) in			
	Notes payable	**(58.1)**	(73.0)	31.8
	Due to non-consolidated finance subsidiaries	**67.7**	51.0	(13.0)
	Proceeds from scientific research investment contracts	**70.0**	20.0	–
	Royalty payments on scientific research investment contracts	**(2.8)**	–	–
	Proceeds from long-term debt	**32.3**	83.0	224.8
	Decrease in long-term debt	**(77.3)**	(105.8)	(95.2)
	Proceeds from issue of common shares	**27.7**	23.1	29.6
	Investment in non-consolidated finance subsidiaries	**–**	(6.9)	(10.6)
	Dividend from non-consolidated finance subsidiary	**–**	59.7	–
	Total	**$ 37.0**	$ 55.2	$175.6
(Increase) decrease in operating net assets is provided by	(Increase) decrease in			
	Accounts receivable	**$ (44.3)**	$ (87.6)	$ 5.9
	Inventories	**36.5**	(66.2)	(56.2)
	Prepaid expenses	**(1.6)**	.6	5.0
	Tax benefit of loss carryforward	**–**	12.7	(32.6)
	Deferred income taxes	**(12.2)**	13.2	12.7
	Increase (decrease) in			
	Accounts payable and accrued liabilities	**91.1**	46.8	166.3
	Taxes payable	**22.7**	36.6	(17.6)
		$ 92.2	$ (43.9)	$ 83.5

1. Accounting policies

The accompanying financial statements have been prepared in accordance with Canadian generally accepted accounting principles and conform in all material respects with International Accounting Standards. With respect to the consolidated financial statements of Northern Telecom Limited and its subsidiary companies, the important differences between Canadian and United States generally accepted accounting principles are described and reconciled in note 2.

a) Principles of consolidation

The consolidated financial statements include the accounts of the corporation and all subsidiary companies except the finance subsidiary companies, which are accounted for on the equity basis. When stock ownership with control of subsidiary companies is acquired, the operations of these companies are included in the consolidated financial statements from the date of acquisition of control.

The finance subsidiaries are not consolidated as their business is fundamentally different from that of the consolidated group. In the consolidated statement of operations, the earnings from operations of the finance subsidiaries reduce long-term interest charges, and foreign currency gains or losses and income taxes are included in the respective captions.

b) Translation of foreign currencies

Current assets (excluding inventories and prepaid expenses), current liabilities, and long-term monetary assets and liabilities are translated at the rates in effect at the balance sheet date, whereas other assets (including inventories and prepaid expenses) and other liabilities are translated at rates prevailing at the respective transaction dates. Revenues and expenses are translated at average rates prevailing during the year except for cost of inventory used, depreciation and amortization which are translated at exchange rates prevailing when the related assets were manufactured or acquired. Currency gains and losses are reflected in net earnings of the year, except for unrealized currency gains and losses on long-term monetary assets and liabilities which are amortized over the remaining lives of the related items.

c) Rental revenue

For operating leases, rental revenue is recognized when billed to customers. For leases which qualify as sales-type leases, the present value of future rental payments is recorded as sales revenue at the inception of the lease.

d) Depreciation

Depreciation is calculated generally on the straight-line method using rates based on the expected useful lives of the respective assets as follows:

Buildings 20 to 40 years; machinery and equipment 3 to 16 years; and equipment for lease to customers four years.

e) Research and development

Research and development expenditures are charged to earnings in the periods in which they are incurred, except for expenditures incurred pursuant to specific contracts with third parties for the manufacture of telecommunications equipment, which are charged to earnings in the same period as the related revenue is recognized.

f) Income taxes

The corporation and its subsidiary companies follow the practice of providing for income taxes based on taxable income included in the financial statements regardless of when such income is subject to payment of taxes under the tax laws. The corporation recognizes investment tax credits by the flow-through method.

g) Inventories

Inventories are valued at the lower of cost (calculated generally on a first-in, first-out basis) and net realizable value. The cost of finished goods and work-in-process inventories is comprised of material, labor and manufacturing overhead.

h) Goodwill

Goodwill represents the unamortized excess of the acquisition costs over the net assets of subsidiary companies and is amortized over periods not exceeding 40 years.

2. Differences between Canadian and United States generally accepted accounting principles

The important differences between Canadian and United States generally accepted accounting principles consist of:

a) Translation of foreign currencies

If the financial statements had been prepared as required in the United States by the Financial Accounting Standards Board's Statement No. 8, earnings before extraordinary item as reported would have decreased as follows:

	1982	1981	1980
Earnings before extraordinary items	**$ (5.4)**	$ (.6)	$(.1)
Earnings per share before extraordinary items	**$(0.15)**	$(.02)	$ –

b) Extraordinary items

1981

The extraordinary gain of $16 ($0.46 per share) as described in note 6, does not meet the criteria of an extraordinary item under United States practice; consequently that amount would have increased earnings before extraordinary item for that year. Net earnings are identical under both Canadian and United States reporting practices.

1980

The extraordinary loss of $163.8 ($4.85 per share) reported in 1980, as described in note 6, does not meet the criteria of an extraordinary item under United States practice; consequently that amount would be deducted to determine earnings before extraordinary item for that year. Net earnings are identical under both Canadian and United States reporting practices.

If the above items were reported in accordance with United States generally accepted accounting principles, the results of operations would have been as follows:

	1982	1981	1980
Earnings (loss) before extraordinary items	**$145.8**	$136.1	$(185.3)
Net earnings (loss)	**$152.8**	$136.1	$(185.3)
Earnings (loss) per share			
–before extraordinary items	**$ 4.15**	$ 3.93	$ (5.48)
–net earnings (loss)	**$ 4.35**	$ 3.93	$ (5.48)

3. Research and development

Research and development expenditures for the years ended December 31, 1982, 1981, and 1980 amounted to $306.8, $238.7, and $193.2, respectively. These expenditures included the costs of research and development charged to customers of Bell-Northern Research Ltd. and its subsidiary, principally to Bell Canada, and costs expended pursuant to specific contracts for the manufacture of telecommunications equipment which are accounted for as contract costs. The net expense of research and development to the corporation for the years ended December 31, 1982 through 1980 inclusive was $241.4, $181.6, and $140.9

4. Investment and other income (net)

Investment and other income (net) includes equity in the net earnings of associated companies of $0.5, $1.4, and $3.5 for the years ended December 31, 1982, 1981, and 1980, respectively.

5. Provision for income taxes

A reconciliation showing income taxes calculated at the Canadian statutory rate to the provision for income taxes is as follows:

	1982	1981	1980
Income taxes at Canadian statutory rate including provincial income taxes	**$103.7**	$ 79.0	$ (7.1)
(i) Reduction of Canadian taxes applicable to:			
Manufacturing profits	**(2.6)**	(1.4)	(2.7)
Research and development incentives	**(7.4)**	(13.6)	(17.6)
Inventory credit	**(3.3)**	(3.7)	(3.6)
(ii) Non-taxable portion of unrealized currency gains	**(5.0)**	(2.2)	(.6)
(iii) Difference between Canadian statutory rate and rates applicable to foreign subsidiaries	**(31.3)**	(35.8)	(31.6)
(iv) Effect of losses of foreign subsidiaries not recognized	**.7**	11.0	65.8
(v) Other	**5.6**	2.5	4.9
	$ 60.4	$ 35.8	$ 7.5

Details of the provision for income taxes are as follows:

	1982	1981	1980
Current	**$ 79.5**	$ 48.4	$ (.7)
Deferred	**(19.1)**	(12.6)	8.2
Total provision for income taxes	**$ 60.4**	$ 35.8	$ 7.5
Canadian	**$ 24.2**	$ 16.8	$ 24.4
Foreign	**36.2**	19.0	(16.9)
Total provision for income taxes	**$ 60.4**	$ 35.8	$ 7.5

Earnings (loss) before income taxes and extraordinary items are as follows:

	1982	1981	1980
Canadian	**$ 58.9**	$ 53.9	$ 81.8
Foreign	**152.7**	102.6	(95.7)
Total	**$211.6**	$156.5	$(13.9)

Deferred income taxes result principally from deductions for tax purposes in respect of plant and equipment being in excess of amounts currently charged to operations.

At December 31, 1982 foreign subsidiaries had tax loss carryforwards for accounting purposes of $100.1, on which tax effects have not been recognized in the accounts and are available to reduce taxable income in future years. Of the total, $86.7 will expire in 1995, while $13.4 can be carried forward indefinitely.

6. Extraordinary items

		(dollars per share)
1982		
Reduction of income taxes arising from the use of prior years' tax losses of a subsidiary company	$ 7	$0.20
1981		
Gain on sale of shares of Intersil, Inc.; proceeds $54.8 (less book value of $18.9 and income taxes of $19.9)	$ 16	$0.46
1980		
Writeoffs of:		
–unamortized goodwill and technology due to unsatisfactory operating performance of the electronic office systems business, and $8.5 relating to Danray, Inc. technology	$(106.4)	$(3.15)
–costs relating to the discontinuance of certain elements of the electronic office systems business (less applicable income taxes of $3.2)	(57.4)	(1.70)
	$(163.8)	$(4.85)

7. Inventories

At December 31, inventories consisted of the following:

	1982	1981
Raw materials	**$192.4**	$138.8
Work-in-process	**220.2**	253.6
Finished goods	**165.8**	222.5
	$578.4	$614.9

8. Long-term receivables and lease commitments (corporation as lessor)

At December 31, 1982, amounts due to the corporation and consolidated subsidiaries under non-cancellable leases and instalment receivables were as follows:

	Operating leases	Sales-type leases and instalment receivables
1983	$31.9	$36.9
1984	9.3	28.5
1985	3.0	13.2
1986	.4	4.3
1987	.1	1.7
Thereafter	–	8.1
	$44.7	92.7
Less: unearned income		(10.0)
current portion		(31.2)
		$51.5

9. Investments in non-consolidated finance subsidiaries

Finance subsidiaries provide funds to some of Northern Telecom's subsidiaries and finance certain equipment sales. Prior to January 1, 1982, they also financed some of the corporation's equipment rentals.

The following is a summary of the combined assets and liabilities of the finance subsidiaries at December 31:

	1982	1981
Assets		
Cash and short-term investments	**$ 62.3**	$ –
Receivables	**139.6**	63.6
Rights to receive rental revenue under:		
Sales-type leases	–	37.9
Operating leases	–	80.6
Inter-group loans	**374.6**	226.3
Other	**7.9**	1.5
	$584.4	$409.9
Liabilities		
Variable rate bank loans, bearing interest at an average of 13.4%	**$ 21.0**	$ 6.0
13 3/8% note payable (U.S. dollars) due April 4, 1984	**12.3**	11.9
7% Convertible subordinated debentures due December 1, 1997 (U.S. dollars)	**98.3**	–
Other liabilities	**30.2**	39.0
Shareholders' equity	**422.6**	353.0
	$584.4	$409.9

During December 1982, Northern Telecom International Finance B.V. (NTIF) issued US$80 of seven percent convertible subordinated debentures which are unconditionally guaranteed on a subordinated basis by Northern Telecom Limited (NTL). The debentures are convertible after March 20, 1983 into common shares of NTL at US$73 per share. The holders have the right to tender their debentures in 1987 for redemption at 120 percent of the principal amount. Prepayment is permitted if the market price of NTL common shares averages at least 120 percent of the conversion price for a specified period.

The following is a summary of the combined operations of the finance subsidiaries for the years ended December 31, 1982, 1981, and 1980.

	1982	1981	1980
Interest income			
–Northern Telecom subsidiaries (net)	**$ 61.2**	$ 68.8	$49.5
–other	**15.3**	12.7	15.6
Rental income	**3.6**	26.6	–
Interest charges	**(4.0)**	(11.6)	(2.2)
Depreciation expense–leasebase	**–**	(21.2)	–
Administrative expenses	**(7.1)**	(5.2)	(1.9)
Earnings from operations	**69.0**	70.1	61.0
Foreign currency gains	**12.6**	.2	6.0
Provision for income taxes	**(12.0)**	(12.1)	(8.8)
Net earnings	**$ 69.6**	$ 58.2	$58.2

Total receivables of $139.6 as at December 31, 1982 include $74.9 of notes receivable plus amounts due to finance subsidiaries under non-cancellable leases which were:

	Direct financing leases
1983	$ 24.2
1984	22.2
1985	20.2
1986	18.2
1987	14.1
Thereafter	10.8
	109.7
Less: unearned income	(45.0)
	$ 64.7

10. Plant and equipment

At December 31, plant and equipment consisted of the following:

	1982	1981
Cost		
Land	**$ 24.3**	$ 22.0
Buildings	**192.7**	156.8
Machinery and equipment	**771.1**	640.3
Equipment for lease to customers	**121.1**	121.3
Property under capital leases	**27.1**	32.7
	1,136.3	973.1
Less:		
Accumulated depreciation and amortization		
Buildings	**51.8**	42.4
Machinery and equipment	**379.9**	319.5
Equipment for lease to customers	**87.0**	41.6
Property under capital leases	**8.6**	9.8
	527.3	413.3
	$609.0	$559.8

11. Goodwill and other assets

At December 31, goodwill and other assets consisted of the following:

	1982	1981
Goodwill	**$23.0**	$23.3
Technology	**2.2**	3.1
Deferred charges	**8.3**	2.7
	$33.5	$29.1

Total amortization charged to operations for the years ended December 31, 1982 through 1980 was $4.8, $2.1, and $113.4, respectively. The $113.4 amortization in 1980 included the write-off of $89.4 of goodwill and $17 of technology.

12. Unused bank lines of credit

At December 31, 1982, the corporation and certain subsidiary companies had unused bank lines of credit, generally available at the prime bank rate of interest, of approximately $436.

13. Scientific Research Investment Contracts

In January 1982, the corporation and a subsidiary concluded arrangements to fund a portion of 1982 research and development expenditures. The subsidiary received $70 in cash in exchange for an obligation to pay eight semi-annual and variable royalties, commencing June 30, 1983, based on the corporation's worldwide telecommunications revenues. The arrangements provide for

the investors to treat their investment as research and development for tax purposes and thus research and development income tax incentives in respect of the expenditure are available to the investors and not to the corporation. In 1981, $20 was received under similar arrangements and funded a portion of 1981 research and development expenditures.

At December 31, 1982, estimated payments under the Scientific Research Investment Contracts for the years 1983 through 1986 amount to $22.1, $23.7, $23.4, and $13, respectively.

14. Long-term debt

	1982	1981
Sinking fund debentures		
6½% 1962 Series due December 15, 1982	$ –	$ .2
7¼% Series C due April 15, 1986	**1.2**	1.2
10½% Series D due April 30, 1990	**12.6**	12.6
	13.8	14.0
Variable rate obligation to bank (U.S. dollars)	–	23.7
7% Instalment notes (U.S. dollars)	–	4.6
Variable rate revolving bank loans of European subsidiaries (various currencies) bearing interest at an average rate of 13.3%	**12.1**	26.5
Variable rate term loan (U.S. dollars) due on December 20, 1985. At December 31, 1982 the effective rate was 12.1%	**30.7**	29.6
Variable rate bank loan (U.S. dollars)	–	29.6
12¼% Notes (U.S. dollars) due October 1, 1990	**86.2**	88.9
9¼% Subordinated notes (U.S. dollars) due June 30, 1989	**30.7**	–
12¼% Subordinated convertible notes (U.S. dollars) due December 1, 1993	**61.4**	59.3
Obligations under capital leases	**22.6**	25.7
Other	**.6**	1.2
	258.1	303.1
Less amount included in current liabilities	**13.5**	57.1
	$244.6	$246.0

The 12¼ percent subordinated convertible notes mature December 1, 1993 and are convertible after December 17, 1986 into common shares of the corporation at a conversion price of US$61.50 per share. On or after January 1, 1982, the corporation may prepay the notes under certain circumstances, in which case the holders have the right to convert their notes.

On June 30, 1982, the corporation sold privately US$25 of 9¼ percent subordinated notes maturing June 30, 1989 with warrants to purchase 500,000 common shares at US$46.25 per share. The warrants are exercisable at any time to June 30, 1989. An effective yield of 12 percent is guaranteed on the outstanding notes at the maturity date, depending on the number of warrants exercised.

At December 31, 1982, the amount of long-term debt payable, including net sinking fund requirements, for the years 1983 through 1987 was $13.5, $1.2, $31.7, $2, and $0.7, respectively.

15. Stated capital

The authorized capital stock of the corporation consists of an unlimited number of common shares without nominal or par value and an unlimited number of Class A Preferred Shares and of Class B Preferred Shares without nominal or par value, with the consideration to be determined by the Board of Directors for the issue of any of such shares. The preferred shares were authorized in 1982; no preferred shares have been issued to date. At December 31, 1982, Bell Canada owned 55.4 percent of the outstanding common shares of the corporation. On January 27, 1983, the Board of Directors recommended for approval by the shareholders of the corporation at the Annual and Special meeting to be held on April 29, 1983, a three for one division of the common shares of the corporation issued or reserved for issuance, to become effective May 11, 1983.

Outstanding common shares at December 31 and stated capital were:

	1982		1981	
	Shares	Amount	Shares	Amount
January 1	**34,947,544**	**$496.7**	34,432,788	$473.6
Issued during the year	**503,218**	**27.7**	514,756	23.1
December 31	**35,450,762**	**$524.4**	34,947,544	$496.7

Common shares issued and the number of common shares reserved for issue were as follows:

	Issued	Issued	Reserved for Issue as at December 31
	1982	1981	**1982**
Shareholder Dividend Reinvestment and Stock Purchase Plan	**372,549**	459,893	**1,077,671**
Investment Plan for Employees–Canada	**124,307**	54,863	**470,830**
Employee Thrift/Savings Plan–U.S.A. (effective January 1982)	**6,362**	–	**243,638**
Warrants expiring June 30, 1989	–	–	**500,000**
12¼% subordinated convertible notes	–	–	**813,009**
7 percent Convertible subordinated debentures due 1997, issued by NTIF	–	–	**1,095,890**
	503,218	514,756	**4,201,038**

16. Plans for employees' pensions

Northern Telecom and most of its subsidiary companies have non-contributory defined benefit plans which provide for service pensions based on length of service and rates of pay for substantially all their employees.

The policy is to fund pension costs through contributions based on various actuarial cost methods as permitted by pension regulatory bodies. Such costs are funded as accrued and reflect actuarial assumptions regarding salary projections. Pension costs charged to earnings were $64.7 for the year ended December 31, 1982 ($52.2 in 1981 and $52.4 in 1980) which included costs associated with voluntary payments for retired employees.

In compliance with the United States Financial Accounting Standards Board's Statement No. 36, the disclosure of the following information is required to exclude actuarial assumptions regarding salary projections. A comparison of accumulated plan benefits and plan net assets is provided as follows:

January 1,	**1982**	1981
Actuarial present value of accumulated plan benefits		
–vested	**$486.1**	$452.0
–non-vested	**20.2**	17.0
	506.3	469.0
Net assets available for benefits at market value	**$592.2**	$564.0

The weighted average assumed rate of return used in determining the actuarial present value of accumulated plan benefits was eight percent for 1982 and seven percent for 1981.

17. Leased property and commitments

At December 31, 1982 future minimum lease payments under capital and operating leases were as follows:

Year ending December 31	Operating	Capital
1983	21.5	4.8
1984	14.9	4.6
1985	10.2	4.4
1986	8.6	4.1
1987	5.1	3.6
Thereafter	15.8	34.5
Total commitments	$76.1	56.0
Less: interest		(26.0)
executory costs		(7.4)
Obligations under capital leases		$22.6

Future sublease rentals related to operating leases were $3.6.

Rental expense on operating leases amounted to $45, $31.1, and $30, for the years ended December 31, 1982, 1981, and 1980, respectively.

18. Information on business segments and geographic areas

Business segments

In 1982 Northern Telecom operated in two principal businesses– telecommunications equipment and electronic office systems (EOS).

The telecommunications equipment business consists of the design, development, manufacture and marketing of central office switching equipment, subscriber apparatus, business communications systems and network systems, transmission equipment, and wire, cable, and outside plant products.

The EOS business involved the design, manufacture and marketing of computer terminals and peripheral equipment used to access, process, store, and transmit data. In the latter part of 1982, EOS was reorganized as part of the Integrated Office Systems (IOS) organization which itself is part of the telecommunications segment. In 1983 EOS will therefore not be reported as a separate segment.

In addition, Northern Telecom has a research and development organization, Bell-Northern Research Ltd., which undertakes the major part of the research activities of Northern Telecom and Bell Canada including research, design, development, long-range planning and systems engineering in all phases of telecommunications and electronic office systems.

The following table sets forth information concerning the business segments for the years ended December 31, 1982, 1981, and 1980.

	1982	1981	1980
Total revenues*			
Telecommunications equipment			
Customers	**$2,688.6**	$2,248.5	$1,751.2
Intersegment	**.9**	3.4	2.1
	2,689.5	2,251.9	1,753.3
Electronic office systems			
Customers	**287.7**	274.2	259.0
Intersegment	**8.7**	2.9	–
	296.4	277.1	259.0
Other			
Customers	**59.2**	48.2	44.4
Intersegment	**221.0**	149.4	98.9
	280.2	197.6	143.3
Elimination of inter-segment revenues	**(230.6)**	(155.7)	(101.0)
Total customer revenues	**$3,035.5**	$2,570.9	$2,054.6
Operating earnings (losses)			
Telecommunications equipment	**$ 437.4**	$ 301.8	$ 187.4
Electronic office systems	**(98.5)**	(15.7)	(86.7)
Other	**10.3**	2.1	3.5
Segment operating earnings	**349.2**	288.2	104.2
General corporate expenses	**(126.3)**	(100.6)	(82.5)
Operating earnings	**222.9**	187.6	21.7
Equity earnings	**.5**	1.4	3.5
Other income (expense)	**(11.8)**	(32.5)	(39.1)
Earnings (loss) before income taxes and extraordinary items	**$ 211.6**	$ 156.5	$ (13.9)
Identifiable assets			
Telecommunications equipment	**$1,536.4**	$1,383.6	$1,145.8
Electronic office systems	**187.1**	300.6	393.1
Other	**130.2**	106.5	80.6
Adjustments and eliminations	**(62.0)**	(73.9)	(77.4)
Identifiable assets	**1,791.7**	1,716.8	1,542.1
Investments in non-consolidated subsidiaries and associated companies and other	**433.0**	359.5	371.8
Corporate assets	**217.3**	71.0	71.7
Total assets as at December 31	**$2,442.0**	$2,147.3	$1,985.6

	1982	1981	1980
Depreciation			
Telecommunications equipment	**$ 69.6**	$ 49.3	$ 41.9
Electronic office systems	**76.8**	49.7	57.2
Other	**13.7**	12.9	10.5
Corporate	**9.3**	5.8	3.1
Total	**$169.4**	$117.7	$112.7
Capital expenditures			
Telecommunications equipment	**$145.3**	$ 91.8	$127.8
Electronic office systems	**51.8**	97.3	78.1
Other	**31.5**	16.7	16.0
Corporate	**24.0**	3.8	3.7
Total	**$252.6**	$209.6	$225.6

Geographic Areas

The following table sets forth information by geographic area for the years ended December 31, 1982, 1981, and 1980.

Business segments by geographic areas	1982	1981	1980
Total revenues*			
Canada			
Customers	**$1,392.3**	$1,334.6	$1,084.0
Transfers between geographic areas	**249.9**	160.2	87.5
	1,642.2	1,494.8	1,171.5
United States			
Customers	**1,473.4**	1,047.0	807.0
Transfers between geographic areas	**93.8**	85.3	67.4
	1,567.2	1,132.3	874.4
Other			
Customers	**169.8**	189.3	163.6
Transfers between geographic areas	**17.1**	15.5	2.8
	186.9	204.8	166.4
Eliminations of transfers between geographic areas	**(360.8)**	(261.0)	(157.7)
Total customer revenues	**$3,035.5**	$2,570.9	$2,054.6

	1982	1981	1980
Operating earnings			
Canada	**$ 357.1**	$ 325.0	$ 253.5
United States	**195.5**	114.6	(37.1)
Other	**38.4**	31.2	26.9
Adjustments and eliminations	**(.4)**	(1.0)	1.8
Operating earnings before research and development expense	**590.6**	469.8	245.1
Research and development expense	**(241.4)**	(181.6)	(140.9)
Segment operating earnings	**349.2**	288.2	104.2
General corporate expenses	**(126.3)**	(100.6)	(82.5)
Operating earnings	**222.9**	187.6	21.7
Non-operating expenses less other income**	**(11.3)**	(31.1)	(35.6)
Earnings (loss) before income taxes and extraordinary items	**$ 211.6**	$ 156.5	$ (13.9)
Identifiable assets			
Canada	**$ 952.6**	$ 815.3	$ 663.1
United States	**1080.3**	839.7	846.8
Other	**174.8**	153.0	98.2
Adjustments and eliminations	**(416.0)**	(91.2)	(66.0)
Identifiable assets	**1,791.7**	1,716.8	1,542.1
Investments in non-consolidated subsidiaries and associated companies and other			
United States	**78.1**	67.0	70.2
Other	**354.9**	292.5	301.6
Total Investment	**433.0**	359.5	371.8
Corporate assets	**217.3**	71.0	71.7
Total assets as at December 31	**$2,442.0**	$2,147.3	$1,985.6

*Revenues from customers include sales to Bell Canada, its telephone subsidiary and associated companies.

**Includes equity in net earnings of associated companies.

Transfers between business segments and geographic areas are made at prices based on total cost of the product to the supplying segment.

The point of origin (the location of the selling organization) of revenues and the location of the assets determine the geographic areas.

Of the total customer revenues, including research and development, Bell Canada, its telephone subsidiary and associated companies accounted for $913.8, $911.7, and $722.2 for the years 1982 through 1980, respectively. Total revenues also include rental and service revenue of $186.8, $163.8, and $150.1 for the years 1982 through 1980, respectively.

Operating earnings represent total revenues less operating expenses. Research and development costs cannot be allocated on a geographic basis. In computing operating earnings, none of the following items has been added or deducted: investment and other income (net), interest charges, currency gains (losses), general corporate expenses, income taxes, and extraordinary items.

Identifiable assets are those assets of the corporation that are identified with the operations in each business segment or geographic area. Corporate assets are principally cash, investments, and corporate plant and equipment.

Finance subsidiaries are not consolidated (see notes 1 and 9).

Quarterly Financial Data (Unaudited)

(millions of dollars except per share figures)

Summarized consolidated quarterly financial data for 1982 and 1981 are as follows:

	4th Quarter		3rd Quarter		2nd Quarter		1st Quarter	
	1982	1981	**1982**	1981	**1982**	1981	**1982**	1981
Revenues	**$788.1**	$708.4	**$739.5**	$637.1	**$790.8**	$641.6	**$717.1**	$583.8
Gross profit	**$260.5**	$218.6	**$228.3**	$173.8	**$225.5**	$177.0	**$211.9**	$159.1
Earnings before extraordinary items	**$ 38.9**	$ 36.3	**$ 31.8**	$ 25.7	**$ 42.2**	$ 35.3	**$ 38.3**	$ 23.4
Net earnings	**$ 43.7**	$ 36.3	**$ 34.0**	$ 25.7	**$ 42.2**	$ 35.3	**$ 38.3**	$ 39.4
Earnings per share *								
–before extraordinary items	**$ 1.10**	$ 1.04	**$ 0.90**	$ 0.74	**$ 1.20**	$ 1.02	**$ 1.10**	$ 0.68
–after extraordinary items	**$ 1.24**	$ 1.04	**$ 0.96**	$ 0.74	**$ 1.20**	$ 1.02	**$ 1.10**	$ 1.15
Weighted average number of common shares outstanding (thousands)	**35,373**	34,819	**35,236**	34,682	**35,085**	34,574	**34,959**	34,445
*If U.S. generally accepted accounting principles had been used (see note 2 to Notes to Consolidated Financial Statements), earnings per share before and after extraordinary items would have been:								
Earnings per share								
–before extraordinary items	**$ 1.16**	$ 1.12	**$ 1.02**	$ 0.68	**$ 1.06**	$ 0.93	**$ 0.91**	$ 1.20
–after extraordinary items	**$ 1.30**	$ 1.12	**$ 1.08**	$ 0.68	**$ 1.06**	$ 0.93	**$ 0.91**	$ 1.20

Auditors' report

The Shareholders
Northern Telecom Limited

We have examined the consolidated balance sheets of Northern Telecom Limited as at December 31, 1982 and 1981 and the consolidated statements of operations, retained earnings and changes in financial position for each of the three years in the period ended December 31, 1982. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of the corporation as at December 31, 1982 and 1981 and the results of its operations and the changes in its financial position for each of the three years in the period ended December 31, 1982 in accordance with Canadian generally accepted accounting principles applied on a consistent basis.

Touche Ross & Co.

Chartered Accountants

Toronto, Ontario
Canada
February 3, 1983

Consolidated 11-year review

Northern Telecom Limited and subsidiary companies
(millions of dollars)

		1982	1981	1980
Earnings and related data***	Revenues	**$3,035.5**	$2,570.9	$2,054.6
	Depreciation on plant and equipment	**169.4**	117.7	112.7
	Research and development expense	**241.4**	181.6	140.9
	Interest charges	**39.6**	64.2	44.9
	Provision for income taxes*	**53.4**	55.7	4.3
	Net earnings (loss)	**158.2**	136.7	(185.2)
	Earnings (loss) per revenue dollar (cents)	**5.2**	5.3	(9.0)
	Earnings (loss) per share (dollars)			
	–before extraordinary items	**4.30**	3.49	(0.63)
	–after extraordinary items	**4.50**	3.95	(5.48)
	Dividends per share (dollars)	**1.00**	1.00	1.00
Financial position at December 31	Working capital	**636.9**	501.5	452.7
	Plant and equipment (at cost)	**1,136.3**	973.1	835.9
	Accumulated depreciation	**527.3**	413.3	338.0
	Total assets	**2,442.0**	2,147.3	1,985.6
	Long-term debt**	**244.6**	246.0	321.7
	Shareholders' equity	**1,004.2**	853.4	728.3
	Capital expenditures	**252.6**	209.6	225.6
Compensation	Payroll	**1,033.9**	847.7	730.2
	Benefits	**192.3**	144.2	131.5
	Total	**$1,226.2**	$ 991.9	$ 861.7
	Employees at December 31	**34,449**	35,444+	31,915+

+Excludes NETAS employees.
*Includes income tax effects of extraordinary items.
**Excludes long-term debt of non-consolidated finance subsidiaries incorporated in 1978 and 1979.

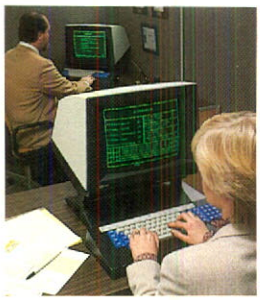
***If the disposals of segments and the extraordinary items had been classified in accordance with United States generally accepted accounting principles, results from continuing operations would have been as follows:

Revenues	**$3,035.5**	$2,570.9	$2,054.6
Net earnings (loss)	**158.2**	136.7	(185.2)
Earnings (loss) per share (dollars) (after extraordinary items)	**4.50**	3.95	(5.48)

1979	1978	1977	1976	1975	1974	1973	1972
$1,900.5	$1,504.6	$1,221.9	$1,083.5	$ 996.8	$ 957.7	$ 608.1	$ 531.3
88.4	52.5	30.9	24.1	23.3	25.4	16.2	12.8
132.6	97.8	68.2	61.4	49.0	44.0	32.7	28.0
38.2	17.1	6.6	6.8	8.3	7.7	6.5	5.6
35.5	36.7	44.9	48.0	44.7	49.6	30.5	21.0
113.5	100.7	85.3	77.1	67.5	53.8	32.0	20.1
6.0	6.7	7.0	7.1	6.8	5.6	5.3	3.8
3.70	3.33	3.09	2.79	2.65	2.05	1.35	0.86
3.70	3.55	3.22	2.91	2.55	2.05	1.35	0.85
0.85	0.74	0.66	0.61	0.60	0.525	0.50	0.50
556.9	367.3	337.1	307.6	284.9	281.4	209.7	175.3
692.7	602.1	388.8	360.1	287.2	273.4	257.3	233.8
271.7	231.5	203.1	189.2	164.2	156.6	141.3	127.6
1,884.5	1,344.2	760.1	674.8	570.4	555.2	494.3	370.4
192.0	189.8	52.4	58.3	67.8	104.5	69.6	73.5
917.6	632.6	468.6	400.8	339.9	285.2	245.0	192.1
173.5	127.2	44.7	38.2	31.7	33.2	26.3	19.1
651.8	482.9	395.3	347.2	325.0	301.2	214.1	192.2
108.1	93.3	75.0	58.0	45.0	41.2	35.1	30.0
$ 759.9	$ 576.2	$ 470.3	$ 405.2	$ 370.0	$ 342.4	$ 249.2	$ 222.2
33,301 +	31,756 +	24,962	25,277	23,751	26,147	25,073	20,787
$1,900.5	$1,365.9	$1,074.3	$ 925.6	$ 832.7	$ 772.4	$ 487.8	$ 455.6
113.5	102.5	83.4	73.5	67.4	56.9	35.4	21.8
3.70	3.61	3.15	2.77	2.55	2.17	1.49	0.93

Principal products

SL-1s are in-service in 40 countries serving more than 2.2 million telephone lines.



Omniword word processing is available on Northern Telecom's distributed data processing systems.

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Data packet switching networks
Basic and featured electronic key telephone systems
Electronic and digital PBX systems (combined voice and data)
Private and carrier network switching systems

Electronic office equipment
On-line terminal systems
Data entry terminal systems
Distributed data processing systems
Remote batch terminal systems
Integrated voice and data terminals

Subscriber apparatus
Rotary dial, push-button and key telephones
Electronic and featured telephones
Style, decorator, and novelty telephones
Coin telephones
Hands-free speaker units
Repertory dialers
Modular hardware
Headsets
Specialty and accessory terminals

Cable
Telephone wires
Composite coaxial cables
Switchboard wires and cables
Pulp and paper ribbon insulated telephone cables
Polyolefin insulated telephone cables
Frame wires
PVC insulated inside wiring cables

Outside plant
Customer premises distribution systems
Central office protectors and connectors
Subscriber protection devices
Terminals and closures
Splicing connectors
Loading devices
Outdoor cross connect systems

Test equipment
Transmission test equipment
Signaling and supervision test equipment
Service observation test equipment
Service analysis equipment
PCM carrier test equipment
Loop test equipment
Trunk test equipment
Data communications diagnostic test equipment
Data communications patching and switching equipment
Data communications remote access switching and patching equipment

Central office switching
Step-by-step systems
Crossbar switching systems
Electronic switching systems
Digital switching systems
Traffic Operator Position Systems
Centralized Automated Loop Reporting Systems
Peripheral systems

Power equipment
Power plants
Ringing and tone equipment

Transmission
Analog and digital carrier systems
Analog and digital multiplex systems
Analog and digital microwave radio systems
Voice frequency equipment and systems
Digital line transmission systems
Optical fiber transmission systems
Private network transmission systems
Special subscriber services

The Vantage 12 electronic key telephone system (above) will be joined in 1983 by a larger-capacity system, the Vantage 48.

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Listing of stock

Montreal Exchange
New York Stock Exchange
The Toronto Stock Exchange
Vancouver Stock Exchange

Stock symbols
NT on NYSE
NTL on Montreal, Toronto, and Vancouver exchanges

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Shareholders wanting to purchase additional shares of Northern Telecom Limited can take advantage of a convenient and cost-free investment plan. Quarterly dividends may be invested automatically to purchase additional shares at a discount from the average market price (calculated during a fixed period each quarter). Shares may also be purchased by voluntary cash payments of as little as $50 to a maximum of $5,000 during a quarter. In either case, there are no brokerage fees or other service charges. Additional information may be obtained from:
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